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32" Dredge "Kappa" in action. Stern view. This dredge and the "Henry Fladd" were built for the Mississippi River Commission by the Bucyrus Company of South Milwaukee, Wis. A descriptive article of these machines will appear in an early issue.

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THE EXCAVATING ENGINEER PUBLISHING COMPANY

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Class 14 Bucyrus Drag Line Excavator Stripping Phosphate Deposits at Mt. Pleasant, Tenn.

A Revolution in Stripping Phosphate Deposits Near Mount Pleasant, Tenn.

THE stripping of overburden from phosphate deposits is the latest operation which has been revolutionized by the perfection of the drag line excavator. Within the last few months T. W. Crow has succeeded in opening the eyes of the phosphate mining industry by his very successful stripping operations in the vicinity of Mount Pleasant, Tennessee. In this district the greater proportion of the phosphate rock lies under a rather thin overburden and hence makes stripping operations possible.

This overburden consists of a hard red clay, pipe clay, flint boulders and some bog iron ore and has an average depth of about nine feet.

In the past there have been four principal methods of stripping. By far the most common is by wheel scraper outfits under a contract price of fourteen cents per yard. One company pays fifteen cents, but does not advance any money ahead of the engineers' estimate. This method is too well known to warrant description. Suffice it to say that the scraping is usually done in pits 40 to 60 feet wide and 150 to 300 feet long. Trouble is often encountered when hard material is met with and again in rainy weather when the ground becomes too miry for a scraper outfit. In short this method cannot be depended upon for regular operation.

Steam shovels have been little used. The one great drawback to their successful operation is the manner in which the scraping has been done, that is in widely scattered pits with long hauls for dirt. The pockety nature of the deposits partly accounts for this as well as does the unevenness of the strata. But it must be admitted that a portion of the responsibility for the failure of this method is due to the lack of proper system in mining. The Grab Bucket has been tried, but it has been found that this type of excavator will not handle anything economically that a man cannot dig with a shovel. This of course makes it a poor tool where the material is hard.

Still another method that has proved successful under certain conditions is hydraulic stripping. At the Ward mines near Centreville, the overburden is being taken off by hydraulic giant, water under 150 pounds pressure being used through 1½ inch nozzle. The flow back is ditched to a sump with the aid of a ditching hose where it is pumped out by an 8 inch centrifugal pump to the waste. In some cases this is done entirely by gravity. Whenever stiff yellow clay is encountered, the progress is slow and costly, it being possible to remove only about 100 yards in one day at a cost of 17 cents to 20 cents per yard. However, this material is so hard and stiff that it is difficult to handle even with pick and shovel.

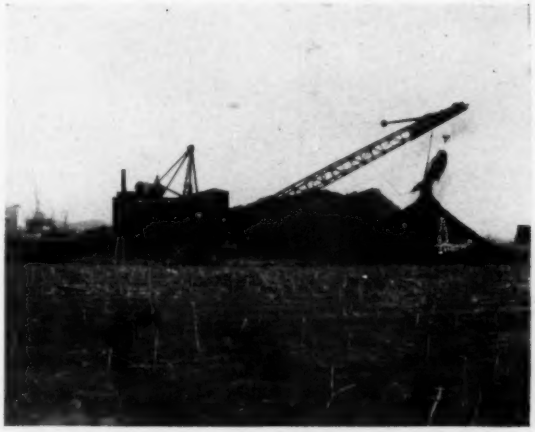
While working in the best of conditions removing loose sand with a small percentage of clay and boulders, it is possible to move at least a thousand yards of material in one day, at a cost of five cents per yard. It will be safer to figure the average cost at 8 cents to 10 cents.

The flow back from the working face will not handle any material larger than ordinary gravel, pieces above 3 inches in diameter must be washed back with the ditching hose and the hydraulic giant.

A centrifugal mine pump will handle pieces two inches smaller in size than the diameter of the suction, though of course, this is very hard on the pump linings and impeller. The practice of this method, however, is limited by physical conditions.

The drag line excavator seems to have eliminated the bad features of all the old methods. It has a high capacity with a low cost of operation. The average contract price being ten cents a cubic yard. It has no trouble, whatsoever, in handling the hardest material encountered in the field and its output does not suffer from rainy weather as does the output of wheel scrapers. Furthermore it has the great advantage of being able to deposit the material far enough from the cut to render unnecessary the extra equipment of cars or wagons as is often the case with steam shovels. Its wide

(*Continued on page 47*)



Showing the Bucket Dumping on the Spoil Bank.

Class 14 Bucyrus Drag Line Excavator in Operation at the Gravel Pit of the Badger Cement Block & Paving Co., Milwaukee, Wis.

The Drag Line Excavator for Gravel Pit Service as Used by the Badger Cement Block & Paving Co.

AN observing person crossing the Milwaukee River by the Folsom St. bridge just north of the City of Milwaukee, will notice on the west bank half hidden by the bulk of a large ice plant, a big mound of gravel. Over the top of this mound he may catch a glimpse of an occasional puff of black smoke and the point of a long boom swinging to and fro. Should this person be curious enough to investigate further he would find one of the few gravel plants in the country that is being operated by a drag line excavator. The proposition is sufficiently unique to be worthy of description.

The Badger Cement Block & Gravel Co's. property lies as before stated on the west bank of the Milwaukee River. For years the pit has been worked by hand, until today the face of the pit is about 1000 feet from the river. This face here rises about fifty feet from the river level.

A year or so ago it became apparent to its owners that it was no longer possible nor indeed safe to work it in the old manner. All of the property up to the foot of the bank had been worked to water and the bank was of such a composition that it would not cave until it had been worked ten to fifteen feet under, which of course placed the workmen in an exceedingly dangerous position.

Furthermore, blasting had been tried with poor results owing to the difficulty of drilling the soft material filled with rocks and boulders.

The gravel is covered with an overburden of clay intermixed with rocks and boulders lying from thirty-five to forty feet in depth. This material is interspersed here and there with tongues of extremely stiff cemented gravel that is handled with difficulty by pick. This material is occasionally shot with dynamite.

Owing to the height and composition of the bank and particularly to the fact that a great part of the gravel lies below water the only machine that could be used with success was a drag line excavator. Consequently the company purchased a Class 14 Bucyrus machine equipped with a 60 ft. boom and a 1½ yard bucket.

The machine was started at the southwest corner of the bank. Here there is about 37 feet of overburden covering the gravel which varies from 25 to 30 ft. in depth to the River level. One of the remarkable features of the property is that the bottom of the gravel bed has never been discovered although numerous test holes have been drilled. It is estimated, however, that there is 200 feet of good gravel under the water level.

As may be readily seen from the photograph, the excavator is at present engaged in digging the overburden and throwing it back of itself parallel to the face of the bank.

The gravel is then dug and dumped in a pile in the rear of the machine. From here it is rehandled and deposited into wagons when there is a demand.

At the present time it is only necessary for the machine to work about 50% of the time. A considerable part of this time is devoted to picking out the tongues of stiff clay. This is rendered particularly difficult by the fact that it lies at a very sharp angle and the bucket must dig almost vertically. But as Mr. Wilson the operator states, "since she can do anything but pick your teeth" she can do this work with remarkable success. The economy of operation may be judged from the fact that the large gang of scrapers and laborers with shovels is replaced by two men, an engineer and a fireman. The teamsters act as pit men, shovelling up about the machine and handling the planks and rollers when it is necessary to move. Owing to the wide digging and dumping radius of the machine it is necessary to move only once in a long time and then only for a short distance.

The excavator loads on an average of about 100 yards of gravel a day. This is dumped into 2-yard

Another View in the Gravel Pit of the Badger Cement Block & Paving Co.

Studebaker and Streich wagons, a wagon being loaded to heaping with two bucket fulls. These can be spotted with ease by the machine despite the fact that no hopper is being used.

Seventy-five yards of this gravel is delivered directly to various parts of the city for concrete work, street paving and other purposes, the remainder or from 25 to 30 yards is carted to the cement block plant located on the property. Here the company turns out from 850 to 900 blocks a day.

It is estimated that it will be about two years before the pit has been cleared out to water level. The drag-line will then commence digging the gravel below water. It may be mentioned that the gravel has been tested 98% clean. This is due to the fact of its clay covering seems to prevent seepage and hence the gradual washing of small foreign particles into the bed.

Handling Stone Ballast

Among the committee reports presented at the recent convention of the Roadmasters' and Maintenance of Way Association, held at Buffalo, there was one which dealt with stone ballast. From the recommendations regarding the handling of ballasting work using stone, the following notes are abstracted:

Ballast can be handled in side-dump cars with flat bottoms, coal cars, or special ballast cars now to be had on the market. After unloading, it should be handled with a spreader.

The track should be prepared for ballast by digging out all the old ballast down to the bottom of the ties, and rounded up to ½ in. above bottom of ties in the center. This will keep the ties from running together until the track is filled with stone. It should be leveled off at ends of the ties.

All decayed ties should be removed and replaced with new ones. Ties should be properly spaced and the track put to gauge and all spikes driven down so that the ties will be tight up to the rail. Then ballast should be unloaded to fill between the ties in the center of the track. This will help keep the track in line and prevent the ties from bunching. From 8 to 12 in. of stone ballast should be placed under the ties, if possible. In raising track on a 9-in. lift the track can be put up in one lift if a large force of men can be secured. Ordinarily the track is put up in two lifts.

In raising in one lift the foreman in charge will learn by practice how many rails a train of 15 or 20 50-ton cars of stone will raise to the required height. The number of rails are counted off and sufficient ballast is unloaded and plowed out. Four men are started making places for jacks. One end of the sight board is placed on the stake, and board leveled. Four jacks are used; two a half rail ahead of the others, the first pair raising the track about one-half the required height. No tamping is required with these jacks, as the stone runs under the track by its own weight. The second pair of jacks raise the track to the required height.

A force of 20 men should follow behind whose particular work is to tamp, and these should be followed by a foreman and 8 men to keep the track in perfect line. The first half of the day should be given to raising the track, the balance of the day being devoted to tamping and lining.

Where two lifts are made, the ties should be tamped with shovels their entire length. After the second lift, the ties should be tamped with tamping picks or bars, the tamping extending from the ends of the ties to 12 in. on the inside of the rail. Particular attention should be paid to tamping under the rail, but the center of the ties should not be tamped.

In dressing up single track, the ballast should be filled in at least within 1 in. of the top of the ties and should slope from the ends of the ties to the edge of the ballast shoulder. This shoulder should not be less than 4 ft. from the gauge line of the outside rail.

Double track should be dressed in the same way, the stone in the center ditch being level with the stone in the track. When the track is bonded for electric signals, it is very desirable that the stone be kept below the base of the rail. The track, after being raised, should be left four to six days before dressing up. —*Engineering Record.*

A Revolution in Stripping Phosphate Deposits Near Mount Pleasant, Tenn.

(Continued from page 43)

radius of operation enables it to strip a cut of from 50 to 80 feet wide working from one side.

The Crow Contracting Co., of which Mr. T. W. Crow is President, have the contract for stripping for four plants. They are doing this work with a Class 14 Bucyrus drag line excavator equipped with a 60 foot boom and a 1½ yard bucket. The field they first uncovered had no outcrop so it was not possible to start in on the outcrop and work in, thus eliminating the necessity of rehandling the material. In this case the overburden had to be dumped on unworked ground and rehandled after the phosphate had been mined from the rock uncovered in the first cut. After this initial cut however, this rehandling was unnecessary, as the material was simply piled up in the cut just dug and mined out.

The first cut was made 86 feet wide at the top with an average depth of 8 feet and slopes of 1 to 1. The material was, of course, deposited all on one side leaving a berme of 20 feet. The method of making this first cut is interesting from an operating standpoint. A side cut was taken first in advance of the machine and the material dumped well ahead in such a manner that the toe of the slope of the dump came close to the line of the berme. The back cut was then made and the material dumped behind the first pile, therefore, its tendency was to roll away from instead of toward the excavator. In this manner a good deal more material was handled than ordinarily.

For the first five months the machine handled 100,000 yards. Although three weeks was lost moving from one cut to another. When on the first cut during a period of one and one-half months the excavator averaged 937 cubic yards in ten hours, despite the fact that 18 inches of rain fell. Under similar conditions it is safe to say that a wheel scraper outfit would have been at a standstill. It is planned in the near future to mount the excavator on caterpillars which will greatly facilitate traveling from one cut to another. This method of mounting, although new, has proved very successful on Bucyrus drag line excavators. One of these machines is now at work digging irrigation ditches in the Brownsville district in Texas.

In order to secure successful drag line as well as other methods of phosphate stripping there are a number of points which must be considered. These may be classed under five heads:—

First.—How can the overburden be disposed of without covering up rock and without long hauls or rehandling? This may be done by starting in on the outcrop and working in, or if no outcrop is available then the first cut must be hauled away to a barren spot, or rehandled. As soon as the first cut is available and mined out, it may be used for dirt room.

Second.—Open up the mines so that the track may be thrown continually without tearing up and so that the entire deposit may be reached with a minimum amount of trackage.

Third.—Sufficient face of rock must be opened up to permit placing of enough trams to supply the plant. It will take from 200 to 250 trams per day to take care of a 200 ton plant.

Fourth.—Always provide for drainage. This must be done or every rain will mean a shut down of the mines.

Fifth.—Provide a good main line track from mines to plant laid with not less than 40-pound rails on a good roadbed, laid by an engineer or trackman. This will enable one dinkey to take the place of two where a good roadbed is used as comparison with a poor one. A 12 to 17-ton engine makes a good size for the main line service, while a 7-ton machine is large enough for switching around the mines and plant.

The actual mining, of course, is another proposition.

There are not many deposits in the Tennessee district which will permit other than hand mining. This is because the rock often runs in deep cutters or veins between the lime stone and the flint. Indeed at times a whole stratum of flinty muck will separate two good layers of phosphate rock. This, of course, makes a close selection by hand mining imperative to obtain a proper grade.

Sometimes it is possible to obtain a good block of rock free from flint and clay seams and unobstructed by lime boulders. Under such conditions a steam shovel is far more economical, but such conditions are rare.

It has yet to be seen whether a drag line excavator would be adaptable to this class of work. There are certain conditions where it might be used to good advantage, but it has never been tried out.

Hollow Steel Piles

Hollow Steel Piles are being employed in the construction of a new freight dock at the port of La Paz, Mexico. The dock is an addition to an existing recreation pier, and is in the form of a "T", 90 ft. long, parallel to the channel and 30 ft. wide. The piles are seamless tubes 8½ in. in diameter, with walls ½ in. thick. They vary from 27 to 33 ft. in length. At the bottom of each pile, there is a conical cast-iron point, 18 in. long, having a water chamber within it into which a pipe connection leads. The water under pressure escapes through two 1-in. holes near the point of the casting, serving to jet the pile. Hydraulic pressure is secured on the jet by a pump outfit on a barge. Protection is provided for the piles in service by an asphalt coating over the steel. This dock is the first structure for freight handling purposes erected at La Paz, which has one of the three naturally protected harbors on the west coast of Mexico.

Class 70-C Bucyrus Steam Shovel, built for Carter Construction Co., at work Grading on the Western Maryland Extension on the South Side of Casselman River.

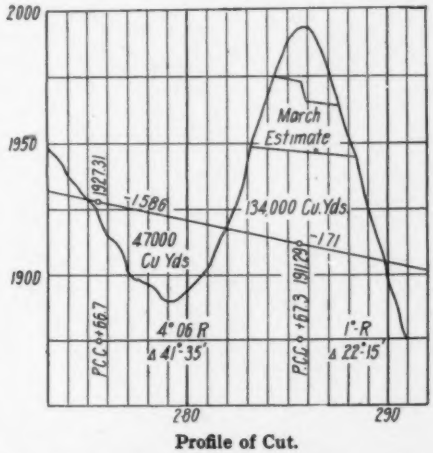
Western Maryland Extension to Connellsville

WHEN in 1902 the Gould interests acquired control of the Western Maryland Railway the line reached westward to Cherry Run, W. Va., connecting there with the Baltimore & Ohio Railroad and northward to Shippensburg, Pa., connecting with the Philadelphia & Reading Railway, together with branches to Gettsburg, and York both in Pennsylvania, aggregating 258 miles of track. The construction of a 6-mile extension from Walbrook, Baltimore, to a tidewater terminal at Port Covington, on the middle branch of the Patapsco River, was completed in 1904. The westward extension to Cumberland, Md., which was completed in 1906, connects with the West Virginia Central Railway, which runs southwest from Cumberland through the rich, soft coal lands in West Virginia to Elkins, Huttonsville and Durbin, connecting at the last place with the Chesapeake & Ohio Railway. The West Virginia Central Railway was purchased in 1902.

Work was started on July 1, 1910 on an 87-mile extension from Cumberland to Connellsville, Pa., where connection was made with the Pittsburgh & Lake Erie Railroad, a part of the New York Central lines, which increases the total trackage of the Western Maryland Railway to 630 miles. This extension, completed in the fall of 1911, crosses the Allegheny Mountains with a maximum grade against east-bound traffic of 42 ft. to the mile, the lowest grade of any line crossing these mountains. Besides giving the Western Maryland Railway an entrance into the great traffic-producing district in and around Pittsburgh, the Connellsville extension gives the New York Central lines a low-grade freight connection to Baltimore. The freight from Pittsburgh and the West is turned over to the Western Maryland at Connellsville and by it to the Reading at Shippensburg for New York and Philadelphia. The Connellsville line traverses the largest coke producing region in the United States. The Reading system is also able to ship coal from the anthracite region to the West by the new line.

The tracks of the Georges Creek & Cumberland Railroad afforded the most practicable route through the Narrows of Wills Creek, a gap in the mountains through which lies the only feasible route from Cumberland to Pittsburgh, and this line was accordingly purchased. Surveys for the extension were commenced in the fall of 1909. The topographical maps prepared by the U. S. Geological Survey were of material assistance in the preliminary work and were found to be very accurate. As a result of their use it was found necessary to run only one preliminary line.

Leaving the Georges Creek & Cumberland tracks the line is carried over Braddocks Run, the Eckhart branch of the Cumberland & Pennsylvania Railroad and the National pike by a through truss bridge of two 155-ft. spans, running on to 55-ft. fill and crossing over a country highway by a 25-ft. concrete arch. Near the end of mile 1 the line enters Cash Valley through a 95-ft. limestone cut and, passing through the valley, encounters at the end of mile 2 a 98-ft. cut containing about 150,000 cu. yds. of material. On mile 4 the line goes through the Brush tunnel, 850 ft. in length, to Jennings Run Valley, over which it passes 300 ft. above the stream, crossing several ridges and hollows, with cuts from 50 to 80 ft. deep and embankments from 50 to 100 ft. At the other side of the valley the line follows the general course of Jennings Run, passing Mt. Savage about 150 ft. above the main part of the town.



Profile of Cut.

On this division there were 13 steam shovels in use by the J. B. Carter Co. The 70-ton Bucyrus used in excavating a 134,000 cu. yd. cut at camp No. 7 in charge of W. M. Douglas, Superintendent, made the record output.

The plan of taking out the cut required a switchback in order to get the material to the fill. The distance from the center of gravity of the cut to the center of gravity of the fill was 1,600 ft. by dinky track measurement, and a 3.5 per cent grade was used from the mouth of the cut, to point of

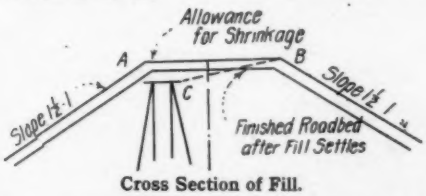
70-C Bucyrus Steam Shovel built for James A. Corbett on Railroad Work in Pennsylvania.

switch-back, a distance of 950 ft. A passing siding open at both ends, of sufficient length to hold a dinkey and 12 dump cars, was placed about mid-way of the switchback, and as soon as the loaded train cleared the up-hill switch the empty train had a clear right-of-way to the shovel.

The record output of 37,100 cu. yds., single 10 hour shifts, in 30 working days was made during the month of March, 1911. We show a profile of the cut and cross section of fill.

The grade left by the shovel in making each cut was always in a uniform condition for moving the shovel back for a new cut and when the dinkey track was thrown, it required very little surfacing to put it in order. A gang of 1 foreman and 4 men maintained the track and kept it in such good condition that it was possible for a 16-ton dinkey to haul twelve 4 cu. yd. cars at a high speed.

A gang of 1 foreman and 8 men was able to take care of the material as it came to the fill and at the same time keep the dump in good shape. In beginning the fill—that is when the material was dumped from the trestle, planks were extended from each side in order to hold a foot walk for the men, so the entire train could be dumped from the trestle. In doing this there was always enough material deposited on the bottom sills of the trestle bents to prevent the main fill from pushing the trestle down. The method of raising the fill from the trestle (which is below grade) to a height to allow for shrinkage, is novel. As the trestle on side hill work is always placed on the up-hill side of the center line, by elevating the down-hill rail, it prevents the cars from being overturned in dumping (requiring very little chaining, only when the cars are loaded with heavy boulders) and at the same time the dump is being raised to the proper height, C to B, at the required width of roadbed on the lower side, as shown in the illustration; the fill is then made from B to A.



Cross Section of Fill.

For the first 15 days the shovel was working in a hard sandstone ledge about 12 ft. thick, and in shooting the material broke in large boulders which required considerable chaining. A total of 16,000 cu. yds. were moved during this time. During the latter 15 days the shovel was working in black shale and moved 21,100 cu. yds.

There were five moves during the month, a distance of 500 ft. each time. There was an average loss of 1 hour per day during the month in shifting track on the dump. The total number of cars for the 30 days were 12,443. The largest day's run was 836 cars, the average number of cars per day was 415, and the average yardage per car was 2.98 cu. yds.

The cost of the work, 37,100 cu. yds. for the month, was as follows:

Total expense of the shovel, including Supt., walking boss, shovel and dinkey crews and all other labor	$3,623.00	$0.0975
Cost of explosives	302.00	0.0075
Cost of trestle	229.00	0.0050
Cost of coal	235.00	0.0075
Cost of oil and waste	32.00	0.0015
Cost of water	112.00	0.00333
Cost of interest on plant	110.00	0.00333
Cost of depreciation	460.00	0.0125
Total	$5,103.00	$0.13816

The equipment comprised one 70-ton Bucyrus shovel, two 16-ton Vulcan dinkey engines, 24, 4-cu. yd. Western dump cars, 54 tons 60-lb. rail and one Cyclone well drill.

The excellent showing made for the month was due to a number of reasons. The superintendent, a man of exceptional ability, with a mind capable of planning his work so as to obtain the best results at a minimum cost, is not only a practical railroad man, but one who respects labor as he wishes to be respected. The old method of driving labor with a club is unknown at this camp and it is only necessary to visit the work in order to see how thorough is the organization. Steam shovels and dinkeys are kept in first-class order and the dinkey tracks would be a credit to some standard gauge steam railroads. Mr. Douglas' rule is the maintenance of a well regulated boarding house for his men and good dinkey tracks, regardless of cost of either, the result of which is one of the main reasons of his success.

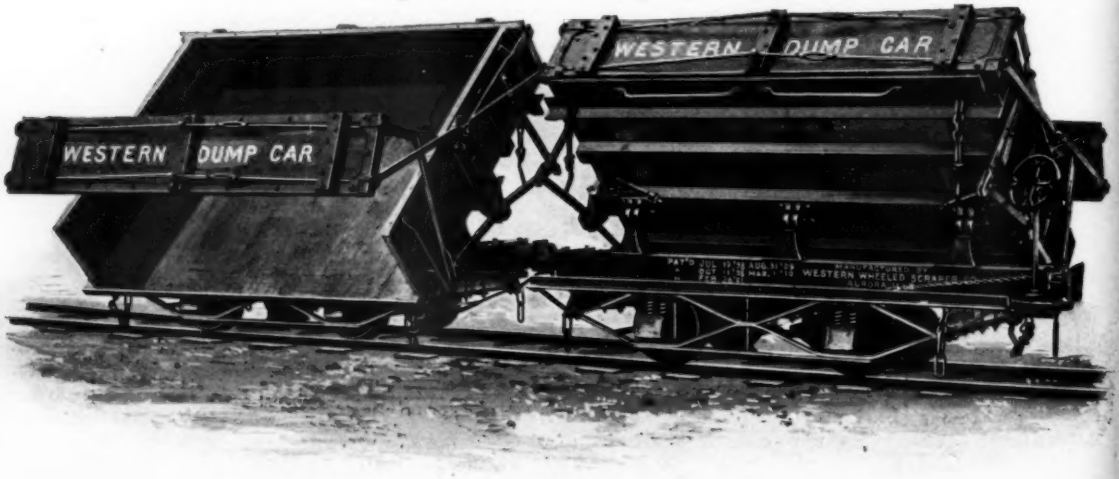
On miles 8 to 11, inclusive, the grading is unusually heavy, averaging about 170,000 cu. yds. per mile. On mile 13 the line crosses under the tracks of the Cumberland & Pennsylvania Railroad three times. At one of these crossings the heaviest cut on the line is encountered. This is 100 ft. deep and 1300 ft. long, containing about 217,000 cu. yds. of material. It was the original intention to tunnel at this point, but on starting the excavation it was found that the ground was undermined and treacherous as a result of abandoned coal workings. The total excavation on mile 13 exceeds 245,000 cu. yds.

Frostburg, a town of about 8000 people, is situated near the middle of mile 14. At the end of mile 16 the line goes through Borden tunnel, 900 ft. long, and continues westward from this point,

following along the southeastern slope of Big Savage Mountain, reaching at mile 20, and 2340 ft. above tidewater, the longest tunnel on the line, Big Savage tunnel, which penetrates the mountain about 700 ft. below the summit. It is 3300 ft. long and is the only single-track tunnel on the line. From the west portal of the tunnel the line crosses the valley between the Big Savage and Little Allegheny Mountains, crossing the summit of the latter through a cut 80 ft. deep and 1800 ft. long. Reaching the headwaters of Flaugherty Creek, the line follows that stream to Keystone, where it crosses the Baltimore & Ohio Railroad and the creek by a bridge 900 ft. long. Myersdale, Pa., one of the most important towns on the route, is reached at mile 30. West of Salisbury Junction the line crosses back to the south side of the Baltimore & Ohio Railroad and of the Casselman River, by means of the longest viaduct on the line, passing 77 ft. above the tracks of the railroad and 110 ft. above the river. This viaduct is 1908 ft. in length and is made up of a series of steel towers resting on concrete pedestals and supporting deck girders of alternate 30 and 60 ft. spans.

From this point the line practically parallels the Baltimore & Ohio to Connellsville, keeping on the south side of the Casselman River to Pinkerton, where it crosses back to the north side, going through a spur of the mountain by means of a tunnel 840 ft. long. From the western portal of this tunnel the line crosses again to the south side of the river by means of a deck girder bridge of six 90-ft. spans, and continuing on that side of the stream to Harnedsville, where a fourth crossing is made on a deck girder bridge of five spans and a total length of 303 ft. West of this point the route lies between the Baltimore & Ohio's low grade line and the Whites Creek branch of that road, crossing over the latter and also the Casselman River at Confluence. West of Confluence the line crosses the Youghiogheny River and follows along on the south bank of that stream to Ohio Pyle, where two crossings are made, the first on a deck girder bridge of seven 80-ft. spans and the second on one of six 110-ft. spans. From this point the line continues along the south bank of the river, crossing the Dunbar Creek bottom, near Connellsville, by means of a 55-ft. fill 2700 ft. long.

The construction work from Cumberland to the Maryland-Pennsylvania State line was done under the charter of the Georges Creek & Cumberland Railroad, and in Pennsylvania under the charter of the Connellsville & State Line Railway, which was secured for this work. The general contractor for the 87-mile extension was the Carter Construction Company, of Chicago, Mr. John B. Carter, president. For the grading of the line from the head of the Narrows to the summit of the Alleghenys, a distance of 29 miles, Mr. Carter formed an organization known as the John B. Carter Company, with headquarters in Cumberland, and this company is working as a sub-contractor. On this section is encountered the heaviest grading work to be found on the entire line, the work including the Brush, Borden and Big Savage tunnels. The work west of mile 29 was sublet to a number of parties.



4-cu. yd. Western Side-Dump Cars in Dumping Position.

Practically all of the excavation was done with steam shovels, of which there are thirty-three in operation over the entire line, four 95-ton Bucyrus, ten 70-ton Bucyrus, one 65-ton Vulcan, one model 60 Marion and 17 smaller types. The spoil was moved in 4-cu. yd. Western side-dump cars hauled by dinkey engines operating on a 3-ft. gauge track. Special care was exercised in keeping the construction track in good condition and the contractor working the 29 miles above referred to established a ruling that no track should be laid on a grade exceeding .50 per cent, the result being that the dinkeys are able to handle nine-car trains and very little time was lost as a result of wrecks and other delays attending operations over poor track.

The installation of equipment along the entire line was carried out as follows: From Connellsville eastward to Myersdale the plant was handled over the Baltimore & Ohio to points on the opposite side of the river from the right-of-way. The smaller steam shovels were used to cut temporary roadways through to the river and log roads were built across the stream, the shovels cutting their way through the opposite bank and moving under their own power, in some instances augmented with block and tackle, to the right-of-way. The crossing of the stream was greatly facilitated by the extreme low stage of the water at that time. The work of the John B. Carter Company was located through the hilliest and most inaccessible section encountered along the line. Temporary track was laid along the highways and in many instances roadways had to be made by the steam shovels. The latter were moved in under their own power, the other equipment by means of a 26 H. P. Buffalo-Pitts tractor and road freight car. These roadways were well graded and were used by the contractor in delivering coal and other supplies to the several points along the line where work was being carried on. It was found that the four 95-ton steam shovels used on this work could travel under their own power under the trying conditions encountered, to a much better advantage than could the lighter shovels. They regularly use a 4-cu. yd. dipper, but on this work, due to the large quantities of shale and sandstone to be handled and the size of the cars employed for disposal of the spoil, they were fitted with 2½-cu. yd. dippers. These heavy shovels proved specially well adapted to the conditions found on this section, being sufficiently powerful to dig through shale and other strata which, for the lighter machines, would have to be loosened by blasting.

Most of the drilling was done with well drills using a 4-in. bit and operated by steam. A hole 20 to 30 ft. deep was drilled, then sprung with dynamite and loaded with from 40 to 50 kegs of black powder, the charge being dependent upon the nature of the ground. The well drills have been found to be more economical than the ordinary steam drill in shale and hard ground, but the latter type is preferred in hard rock.

Big Savage tunnel was worked by driving the headings from both portals until they met, before starting with the bench excavation. The material encountered was hard sandstone, coal and fire clay, requiring considerable timbering. The drilling was done with Ingersoll-Rand E-24 drills, two columns being set up in the heading and two drills on each column. Eight 10-ft. center cut holes, including lift holes, are drilled and five 8-ft. side holes on each side. Sixty per cent dynamite was used and the heading was advanced from 5 to 7 ft. at each round. The combined daily progress of the two headings was 18 ft., working 2 shifts of 8 hours. On the three smaller tunnels, the bench was not taken out until the headings were driven through. These tunnels run through a softer material, requiring timbering throughout their entire lengths. The four tunnels were lined with concrete.

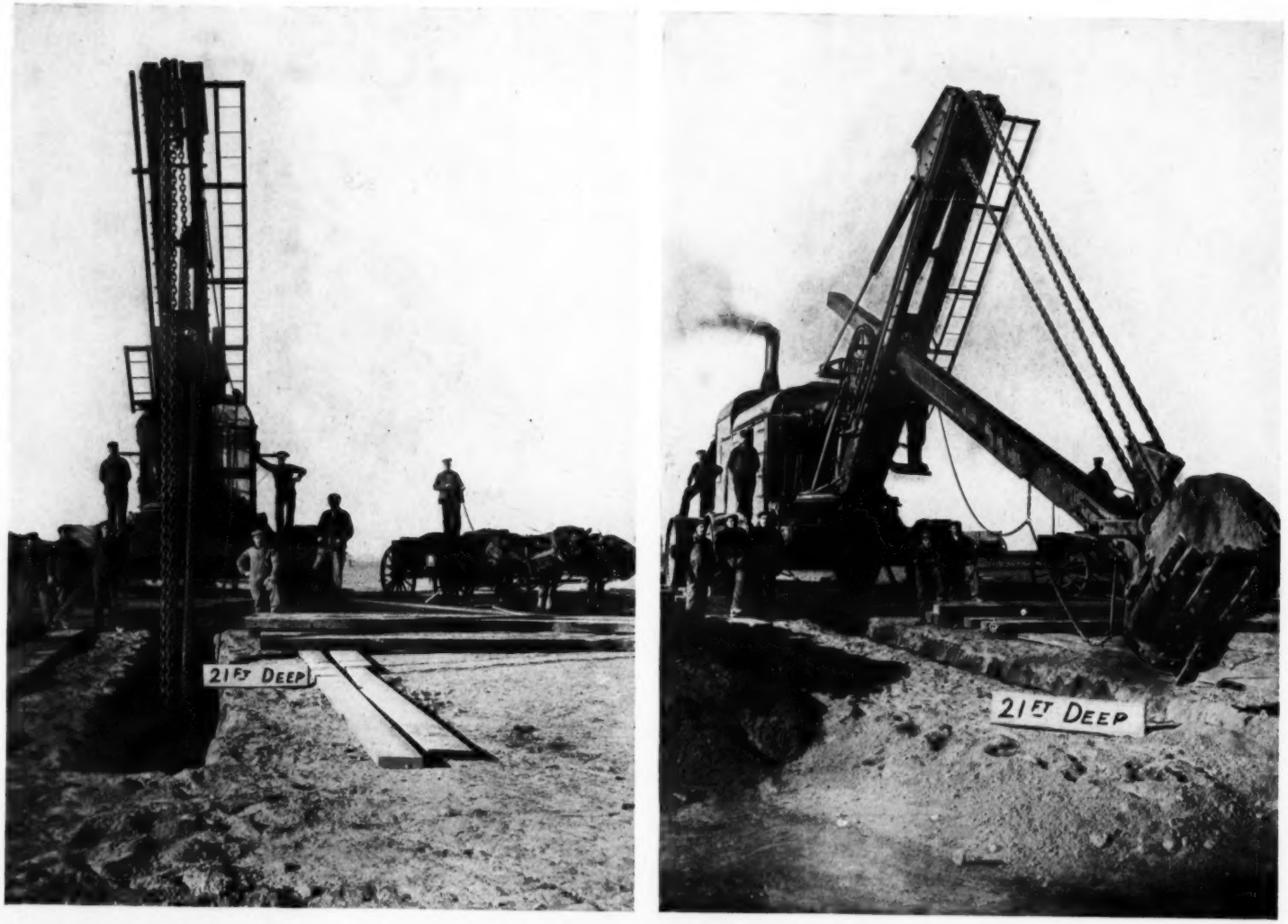
The power plant at the Mt. Savage tunnel was situated near the west portal and housed in a frame building 82x42 ft. in plan, in one end of which was a machine shop and a storeroom for duplicate parts of all the machinery used. Three 75 H. P. tubular boilers and a feed-water heater were installed, together with two Ingersoll-Rand air compressors of 200 H. P. each. Current for lighting was furnished by a 25 K. W. alternating-current Woods dynamo operated by a 9x8-in. American Blower Company's engine. This plant furnished power for both ends of the tunnel, a 5-in. pipe line running over the hill to the east portal and a 3-in. line to the west portal.

The total excavation, exclusive of tunnel excavation, on the entire line was approximately 8,000,000 cu. yds.; the total amount of concrete, exclusive of tunnel lining, about 150,000 cu. yds. The contract time for the completion of the work was 15 months from July 1, 1910.

The concrete work was sublet to a number of parties. At each point where such work was carried on a portable rock crusher was installed, and stone from the bed of the river was crushed. When the quantity of sand from the crusher was insufficient, the supply was augmented by the use of Allegheny River sand, which was delivered over the Baltimore & Ohio Railroad and hauled by teams to the site. The concrete was mixed in two grades, that for the footings in the proportion 1:3:6 and for all work above the footings 1:2½:5.

During the operations the low stage of the water in the streams rendered the construction of the bridge pier footings comparatively simple, a clay dike in most cases being sufficient to enable the excavation to be carried on. In a very few in-

(Continued on page 63.)



Two Views of a 40-C Bucyrus Excavator at Work on a Trench 21 ft. Deep.

A Storm Water Sewer at La Grange, Ill.

A Method of Installing a Separate System in the Same Trench.

A 6½ ft. concrete storm water sewer 6500 ft. long has been constructed on Ogden Avenue, LaGrange, Ill., to replace an old 4 x 8 ft. wooden box drain which carried domestic sewage after this passed the septic tanks, as well as the storm water of the town of LaGrange and part of the town of Brookfield. The box drain ended at Vernon Avenue at a point about 2000 ft. from Salt Creek, a small tributary of the Desplaines River. From Vernon Avenue the flow was carried across vacant property to the creek in an open ditch, causing more or less nuisance. Salt Creek empties into the Desplaines River about 2000 ft. below the sewer outlet. In the summer the creek has a flow not much larger than the discharge of the sewer, so that it is little less than a continuation of the open drain. The Desplaines River had a small flow during the summer months, and sewer improvements were brought about by constant complaint by Riverside and other towns farther down the river. Since 1901 the domestic sewage has passed through septic tanks having eight hours' storage, but this treatment did not give sufficient purification to permit discharging the effluent into a stream where at times the degree of dilution was not greater than 1 : 1.

LaGrange, a town of 5500 population, has a combined sewer system, the domestic sewage being diverted to the septic tanks by means of weirs in the sewers. The effluent is carried away through the wooden box storm-water drain. In the new construction the effluent will be carried in a separate conduit laid parallel to the storm-water drain to a sprinkling filter plant located across the creek beyond the storm-water outfall.

The storm-water drain is designed to care for a total area of 2½ square miles. One and one-half square miles lies in LaGrange and the remainder in Brookfield. Brookfield's dry-weather flow is taken care of separately, but the storm water enters the joint storm-water drain by means of overflow weirs. Required capacities were calculated on the basis of 1 in. rainfall continuing for one hour and assuming a 50 per cent. runoff. The sewer has a grade of 0.18 per cent. and velocities were estimated by assuming $n = 0.013$ in Kutter's formula. The cross-section is a 6½ ft. ring of concrete, 8 in. thick. The sanitary sewer is a 15 in. vitrified conduit laid in the same trench with the storm-water drain and in general the centers of the two conduits are at the same elevation. The small sewer is separated from the large one by 6 in. of concrete. As it is under a head varying from 0 to 15 ft., the vitrified pipe is embedded in 6 ins. of concrete. At three points on the sanitary sewer, 8 ins. valves discharging into the storm-water drain are provided for flushing the former.

At the outfall the storm-water drain ends in a head wall 12 ft. long, 14 ft. high, 6 ft. thick at the base and 5 ft. thick at the top. The foundations were carried down 3 ft. below the invert. At this point the sanitary sewer passes under the creek by an inverted siphon made up of 14 in. cast-iron pipe.

Excavation was done with a 45-ton Bucyrus steam shovel having a 36 ft. dipper stick and a 1½ yd. bucket. The outfit was mounted on a truss frame spanning the trench, and rested on 6 in. rollers. No ground water was encountered, but on Ogden Avenue, where the new drain lies alongside the old box drain, the sewage was cared for by building a dam in the box drain at a point upstream from the work, and laying a temporary sewer to the 18 in. Brookfield sanitary sewer on the opposite side of the street. The 18 in. sewer was of sufficient size to carry the dry-weather flow of both towns, but storm water was cared for through the new construction, as the box was either in the line of the trench or so near it that it had to be destroyed. A small amount of back fill was thrown up on the haunches and over the arch as soon as the forms had been removed, but the greater proportion of the back fill was replaced by a Vulcan traction shovel having a 20 ft. dipper stick and ¾-yd. bucket.

Concrete was mixed directly over the trench on a platform resting on rollers. The mixer outfit comprised an engine, a boiler and a Drake continuous mixer discharging through a swinging pipe directly into the forms. Concrete materials were distributed in piles at convenient intervals along the trench either in the street or on private property. From here it was delivered by wheel-barrows directly into the mixer.

About 130 ft. of the sewer invert extending up on the sides to within a foot of the center line was poured before any attempt was made to place the arch. The platform was pulled ahead by a crab on the engine. Forms were then set up and the platform returned to pour the concrete in the arch.

70-C Bucyrus Sewer Excavator, 36′ 0″ Boom, 54′ 6″ Handle, Owned by Mr. J. W. Farley, Chicago, Ill.

These forms consisted of 2 x 6 in. lagging placed over ¾ x 3 in. steel half rings which had their turned-in ends bolted together at the sides of the sewer. To facilitate removal, wedges were placed between the ends of the half rings. The lagging is 16 ft. long and the rings are spaced 4 ft. centers. A steel band 1-16 x 4 in. in cross-section, bent to the half circle with the ends turned in and back to hold the first plank, secures the lagging in place at each side. The last piece placed at the top forms a key which is so wedged against the adjoining pieces that it can be removed quickly. Forms are left in from 36 to 48 hours. The contractor had sufficient lumber to set up about 500 ft. of forms. From 130 to 160 ft. of completed sewer constituted an average day's work, except where a medium hard limestone ledge, varying in depth from 0 to 6.5 ft. was encountered. Two men only were required to remove the forms and carry the material forward. Two other men erected the inner forms for the arch and also placed the boards used on the haunches on the outside.

The invert of the sewer was given a plaster finish ¾ to 1 in. thick, applied as soon as the comparatively dry concrete had been placed. The arch was smoothed up with plaster where necessary as soon as the forms were removed.

The concrete used in constructing the sewer was mixed in the proportions of 1 part Universal Portland cement to 3 parts torpedo sand and 5 parts of 1½ in. broken limestone obtained from quarries about 1½ miles from the work. Mr. H. J. McNichols, of Chicago, was the general contractor for the work. Mr. William B. Ewing drew up the plans and had charge of the construction until his death, when the supervision was turned over to the Ewing & Stone Company, a civil and consulting engineering firm organized by Mrs. Ewing to continue her husband's business.

Neponset River Improvement

On October 3rd bids were opened by the State Board of Health of Mass., for the work of improving the Neponset River.

We give below the canvas of bids. The Barge Canal Construction Co., 150 Nassau St., New York were the low bidders and it is expected that work will be begun by November 15th.

The Barge Canal Construction Co. is composed of Messrs. Chas. Longnecker and Louis B. Harrison both of New York and George W. Beeman of Cleveland, Ohio.

CANVAS OF BIDS OCT. 3, 1912. SECOND LETTING

Name		Item No. 1 130,000 cu. yds. Soft	Item No. 2 130,000 cu. yds. Hard	Item No. 3 100 cu. yds. Boulders	Item No. 4 800 cu. yds. Ledge	Totals
Wm. L. Miller, Boston.	Unit Price	.48 cents	.54 cents	$8.00	$12.00	
	Total	$62,400	$70,200	$800	$9,600	$143,000
Bay Dredging & Cont. Co., Brooklyn.	Unit Price	.425 cents	.425 cents	$13.00	$13.00	
	Total	$55,250	$55,250	$1,300	$10,400	$122,200
John H. Cavanagh, Boston.	Unit Price	.32 cents	.55 cents	$10.00	$10.00	
	Total	$41,600	$71,500	$1,000	$8,000	$122,100
Barge Canal Cons. Co., New York City.	Unit Price	.42 cents	.42 cents	$7.50	$7.50	
	Total	$54,600	$54,600	$750	$6,000	$115,950
U.S. Drainage & Irrig'n Co. New York City.	Unit Price	.58 cents	.72 cents	$14.00	$14.00	
	Total	$75,400	$93,600	$1,400	$11,200	$181,600
Eastern Dredging Co., Boston.	Unit Price	.487 cents	.487 cents	$6.00	$8.90	
	Total	$63,310	$63,310	$600	$7,120	$134,340

*Steam Shovel Work

A treatise, from the practical viewpoint, relating to the problems involved in steam shovel operation.

**Construction Service Co.

Steam shovel operation is rarely a continuous performance, so far as concerns the shovel itself. There are always delays, some of which are due to breakage on the shovel itself, and some to interruptions of one of the collateral processes, breaking or transportation. The most costly of these, in my experience, has been where the shovel was loading blasted rock, and because of imperfect breaking the shovel had to stop from time to time to allow drilling and blasting under the dipper. In one case the interruptions from this cause amounted to nearly fifty per cent, which in an eight hour day allowed the shovel only four hours of actual work. Under such conditions the transportation facilities must be adequate to keep the shovel going full time, so that delays to the shovel increase the cost of transportation correspondingly.

Accidents to the transportation department, due to bad conditions of equipment, rolling stock, or track, cost just as much as delays of the same duration caused by shovel breakdowns. Reserve equipments will often save money in such a situation, but the best safeguard is to give to one man the facilities and responsibilities for seeing that all equipment be kept in first class repair. It is customary for shovel crews to make their repairs to the shovel out of working hours and on Sundays whenever possible.

On heavy rock work, where many repairs are needed, the crews often have to work nearly every Sunday for an entire season, and the consequent lack of rest and recreation is likely to tell on the men's working efficiency.

Stopping to "chain out" boulders on heavy rock work in shale or the schist of Manhattan Island is likely to account for a lost time bill of 20% or more, and presents the most aggravating and discouraging obstacle to good work. In such cases several extra chains should be provided, and two or three men constantly employed in putting them on the boulders as fast as possible while the shovel is working. Even if these men are often idle for several minutes at a time, the result, in shovel output, of their services is worth more than their pay. After estimating how many cents each dipper swing is worth in pay yardage, it is a simple matter to calculate how much should be spent in keeping the dipper working. Mud-capping the boulders, to save "chaining out", is desirable if it can be done without too much delay. Usually it will be found cheaper to keep a man or two drilling block holes, especially if facilities permit the use of a small power drill. When thus drilled the boulders can be cracked with small charges and with almost no interruption to the shovel work. With a small drill (like an air hammer) the holes may be put in on the side of the boulder away from the shovel, if that side can be reached, drilling about six to ten inches deep, tamping with blue clay forced in with the thumbs and fired with a fuse. Very small charges of a rather high power (50 or 60 per cent.) should be used.

A list of various causes of delay should be kept by the shovel runner, and reported daily, with the duration of each, so that the relative importance of the different causes may be known, and a standard remedy adopted. Whenever such a remedy is needed, the shovel can call for it by a whistle signal. The following is a convenient code for these signals, a long toot being indicated by a dash, a short one by a dot:—

—	Means	Pit crew get ready to move shovel.
—·	Means	Get ready to mud-cap.
—··	Means	Get ready to block hole.
—·—·	Means	We need coal.
·—·	Means	We need water.
··	Means	Waiting for cars (useful to help in spotting cars when dinkey man can not see hand signals).
·	Means	Stop.
— — —	Means	Already to blast.
····	Means	Fire.
··—··	Means	Cars off the track.
···	Means	Back up.
— — ··	Means	Shovel has broken down.
·— —	Means	Superintendent's call.

A code of these signals in the shovel cab, and one in the hands of each foreman, will be sure to save money by the elimination of preventable delays.

Running a shovel is a highly trained and highly paid specialty, and as a general thing shovel runners are intelligent and conscientious, but a good deal depends on the way in which a runner and his craneman work together. If they should be of incompatible dispositions it is often better to move one of them to some other shovel than to have them work badly together. They must have considerable confidence in each other in order for the attainment of the highest efficiency.

(To be continued.)

* *Continued from page 11, October issue.*

***Credit for this article in our October issue was inadvertently given to W. E. Bancroft, while it should have been accredited to the Construction Service Co*

The Excavating Engineer

[FORMERLY STEAM SHOVEL NEWS]

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Controlling the Mississippi

When the actual construction of the Panama Canal was studied by engineers of experience in the special departments of work involved, says Cassiers Magazine, it became evident to all that the chief problem to be solved was not the cutting of a channel through the narrow portion of land forming the isthmus, but rather the control of the irregular and torential flow of the Chagres River. The fact that practically all the drainage of an extensive and steep watershed had to reach the sea through this stream, together with the climatic conditions which included much rainfall, rendered this portion of the problem a matter for serious consideration, since upon its practical solution depended the success of all the rest of the undertaking.

It is now well known that the creation of Gatun Lake, providing an extensive reservoir, into which the sudden increase of the volume of flow could be received without making any serious variation in level, was the true method of controlling the Chagres River and of converting it not only into a well regulated supply of water for the canal, but also of providing ample hydraulic power for all operative purposes of the canal.

Now that the work is nearly completed, it may well be considered if the lesson thus learned may not be applied, without delay, to the solution of a similar problem within the borders of the United States, and possibly save for the country losses which exceed the cost of the construction of the entire waterway at the isthmus.

The destructive floods of the Mississippi River are of frequent occurrence, and it seems as if the existing methods of protection against them by the construction and maintenance of levees and bank reinforcements, are inadequate, and even antiquated, when considered as sole defenses against the river floods. The lesson at Panama would indicate that the true method of treating the problem of the Mississippi would be the creation of a number of artificial lakes similar to that at Gatun, and for a similar purpose, their location and size to be determined by topographical and commercial considerations. A number of such lakes, produced by damming the stream at points where the accumulation of water could be controlled, would enable the excess of water to be stored and held back over such areas as would produce but moderate changes in level, even during the season of maximum flow, and thus protect the lower reaches of the river from danger and render the existing levees ample to insure safety. The stored water, as at Panama, would be available for regulated power development, and also enable the desired flow to be maintained during the season when low water would otherwise prevail.

The importance of considering this matter at the present time appears because the United States Government is now in possession of a complete organization, administration, and engineering equipment for the execution of such a plan. Instead of disposing of the extensive equipment so soon as it has finished its work at the Isthmus, the rational and efficient thing to be done would be its transfer to the Mississippi Valley and its tributaries.

Opinions differ as to the best plan for controlling the Mississippi floods. Periodically the levees break and the resulting loss runs into millions of dollars and many lives. It would seem that no further evidence than the history of these floods would be necessary to condemn the levee system. While the reservoir system, as adopted by the Canal Commission for the control of the Chagres River, is a common sense method, it is, as yet, untried and hence its weaknesses unknown.

Even should it be ultimately decided to undertake the control of the flood waters of the Mississippi by the reservoir system we are very doubtful of the practicability of utilizing to any great extent, the equipment used in digging the Panama Canal. All of the machines are now several years old and have been subjected to the severest kind of work.

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It is true that they have been kept in running order by constant repair in the shops established for that purpose, described in our October issue, but it is also true that there would be great difficulty in securing proper fitting repair parts from the builders of these machines because of the fact of the many alterations that have been made. Therefore, it would probably be found cheaper for the government to purchase new standard equipment that could be quickly repaired by parts direct from the several factories than to bring these old machines into the country and carry on the work of repairing them as they were forced to do in Panama.

The reservoir system, if adopted, would unquestionably develop an industrial centre along the Mississippi that would produce finished products at phenominally low costs. The Mississippi and its navigable tributaries would allow the bringing of raw materials by water transportation to the doors of the factories and the distribution of the finished products would likewise reach their destination over a large part of the United States via water routes and go to foreign ports in ships loaded at the docks of these industries.

Power and lighting would be furnished by the waters which are now causing losses impossible to estimate. This service, no doubt, would be in such abundance that much would be transmitted to the interior of adjacent states and utilized for the farm as well as industrial purposes.

The Chicago Record-Herald of September 27, in reporting a speech by Colonel Roosevelt before the Industrial Levee Convention at Memphis says:

Colonel Roosevelt's plan, advocated construction of a complete reservoir system as well as flood protection and federal control of the levees.

"Flood water conservation by forests and reservoirs will meet many needs", he declared. "When it is accomplished by this nation, for only the nation can accomplish it, you of the lower Mississippi valley will never again be submerged by great floods.

"The present levee system" strengthened and maintained as it must be by federal aid, would insure you safety against whatever floods could escape from storage. The fourteen-foot waterway that you desire and need so much would become a reality less through artificial channel correction and canalization than because of increased summer and fall flow, and the benefits of the Panama Canal would thus find their way by water straight to the heart of the continent. The hydro-electric development of the country would be increased by many million horse power, the benefits of which would go direct to the people."

"Such action would mean literally to 'pass prosperity around' ".

The former President, citing the disastrous floods last spring as an "awful lesson", asserted that prospects of relief were no brighter than they had been. This, he said, was true "in spite of the fact that Congress was in session five months after the beginning of the last flood disaster, and that the House was in control of Democrats, mainly southern men, and yet not one measure of permanent relief or lasting help was enacted in your behalf".

"As long as the habit of doing things piecemeal, sometimes known as the states' rights doctrine, stands in the way, nothing effective will be done", he said.

"Half the states have a vital concern in the treatment of the waters of the Mississippi and its tributaries", he continued. "It is evident that no one state can so much as make an efficient beginning in the endeavor to grapple with this subject.

Business Forecast

Even those people who insisted that business could not continue to be good throughout a Presidential campaign, have become convinced that the damage to business operations caused by the political campaign will be so small as to be unworthy of attention. Business has continued to expand, prices have continued to advance on steel, iron, copper and manufactured articles and live stock, while the bumper crops realized and promised are bringing about a considerable reduction in prices of grains, fruits and vegetables.

Never before have we witnessed constantly increasing business activity through the ordinarily dull weeks of Summer and never before has business continued to expand during a Presidential campaign. This condition, coupled with the fact that nearly every crop, whether grain, fruit or vegetable, is setting a new record this year, brings us into the closing months of 1912 surrounded by substantial prosperity.

The Clearings of Banks for the month of August were larger than any previous August, whether we include the City of New York or consider the remainder of the country separate from New York City.

The most unpleasant thing which we have to contemplate just now is the number of Business Failures. The number of failures for August is estimated by our various authorities all the way from 1061 to 1102, but either figure exceeds last year considerably. One of our authorities gives the total liabilities of these failures at 15½ million dollars and another estimates them at something over 16 million dollars. These figures compare with 934 failures in August a year ago, with total liabilities of 12 million dollars. By tracing down conditions surrounding several of these failures, we find that some of them should have occurred

months ago and a few of them years ago. Quite a number of concerns which have been struggling under a heavy load for years probably since 1907, are finding the scarcer money and higher interest rates this Fall a handicap which they cannot overcome. If, as we believe, these failures mean a clearing up of the general business situation, they are a benefit rather than a disaster.

Our total Exports for July were 147¼ million dollars, which was a larger export than we have shown in any previous July. Our total Imports also set a new figure for the month of July at 148½ million dollars, leaving a Trade Balance against us of nearly a million and a half dollars. This is the first month's trade balance in favor of Europe since August, 1910, the balance in our favor for July of last year being slightly under 10 million dollars. Increasing ocean tonnage rates, together with the fact that prices are still too high in this country on many of the leading articles, may have prevented a still larger total of exports. Our imports for each month of this year have exceeded those of the corresponding month of 1911. Europe has many crop failures this year and needs a considerable portion of each of our crops. Our tremendous grain and cotton exports during the next few weeks will again shift the balance of trade to us and will leave Europe heavily in our debt at the close of this calendar year. Exports of grain, meat, live stock, cotton and oils for August totaled 45½ million dollars, two million dollars less than August, 1911, and exactly equal to August, 1910. Exports of these articles for the first eight months of the year totaled over 532 million dollars, compared with 487 million dollars last year and 385 million dollars in 1910.

Little need be said regarding the Steel and Iron situation, which has continued to improve, as far as improvement has been possible. Practically all plants are operating at capacity. The independent companies are as busy as the Corporation plants, and the real reason why there has been but little improvement during the past four weeks is that improvement is practically impossible. While the Corporation will probably not spend over 30 million dollars in new construction during 1912 as against an average of nearly double this amount expended each year for the past five years, the fact that much of the previous construction work is just now nearing completion, means a greatly increased capacity which will soon be available. The Gary mills are practically completed and the Duluth mills nearing completion. Steel demands have been greatly in excess of capacity, although the present capacity was originally planned to take care of the business until 1915, at least. It is gratifying to note that steel prices are not advancing as sharply as they were a few weeks ago, which indicates that good judgment has stepped into prevent a runaway market, which would in the end have brought about an unsatisfactory condition.

Pig Iron prices are at last showing real life and in a measure catching up with what has already occurred in prices on finished steel products. Pig iron production for August was the largest for any August and equal to any previous month since March, 1910, the August production being 2½ million tons.

The Production of Copper during August was the largest showing since July, 1911, but the visible supply for the Uuited States and for the world decreased while the price of electrolytic copper moved a shade upward.

The production of Anthracite Coal for the month of August was more than 6½ million tons, exceeding the previous August by a million tons. This is the largest month's production of anthracite coal on record.

Coke Shipments are running above 10 thousand cars a week and production above 350 thousand tons, with more than 30 thousand ovens in blast. Production is increasing rapidly and some new records may be set in the near future. Prices are hard.

The Production of Gold for August exceeded any previous August and commodity prices advanced slightly on the average. Commodity prices have advanced about 3% so far for the year, while in Europe the increase has been 6%.

Total Bond Transactions on the New York Stock Exchange for the month of Augsut were less than July and below the previous August. Bond prices averaged a fraction of a point lower. The total number of Shares Traded on the Stock Exchange was about nine million, being slightly more than July and only 60% of the figures of August a year ago. Average prices of stocks are from a point to two points lower for the month.

As has been stated in these Reports, the Railroad Situation has been unsatisfactory for some time. Gross Earnings have shown some increases, but Net Earnings have been very low. The tremendous freight movement is improving the situation, and the present business activity, coupled with the bumper crops which must be moved, means better earnings, all cars employed, and we believe a much better showing will be made in the net results. Complete August earnings are not yet obtainable, but increases will be shown in both gross and net, as compared with August of last year.

For the month of July, 416 railroads, operating 230 thousand miles, showed a Gain in Gross of 23 million dollars, or 10%, and a Gain in Net of 8 million dollars, or 12.6%. The interesting part of this exhibit is that net made a larger proportionate gain than gross. This is not natural, nor

could it continue indefinitely, but for a few months it is to be hoped this showing will continue.

Railroad managements are giving careful consideration to the matter of increasing freight car efficiency. On the average, a freight car travels a mile an hour the year around. With quicker handling, including switching, loading and unloading, it is hoped to show 1½ miles per hour, per car. This would, in effect, add one million freight cars to the country's equipment. There are 10 thousand idle cars in the country now, but some of them are not ready for service and others are not to the points where most needed.

All there is to say about Crops is that nearly all of the grain, fruit and vegetable crops will probably set new records and the cotton crop promises to be satisfactory. The expectation is total wheat, 719 million bushels; corn 3050 million bushels; oats, 1250 million bushels; barley, 209 million bushels; flaxseed, 28½ million bushels; buckwheat, 18 million bushels; rye, 35 million bushels; rice, 23 million bushels; potatoes, nearly 400 million bushels; tobacco, nearly one billion pounds; cotton 13,995 bales; and hay, 72 million tons.

The average price of all these crops combined is about 3% below that of a year ago.

Business Conditions are as good as can be expected and manufacturers and merchants should push both sales and collections vigorously. Business is tremendous in the states bordering the Great Lakes, quite satisfactory along the middle Atlantic Coast, good in the middle west and booming on the Pacific slope. The Rocky Mountain states and southeastern states are not quite so active.

What They Think of The Excavating Engineer

Fishkill on Hudson, New York.

"The changes that you have inaugurated in recent issue of Excavating Engineer is a great improvement".

C. S. Leonard, Steam Shovel Engineer.

Glenwood, Iowa.

"Copy of the Excavating Engineer received. It is an interesting number and the general make-up an improvement on your former good magazine".

Seth. Deem, Civil Engineer.

Chicago, Illinois.

"I am much interested in the Excavating Engineer. It is full of meat".

Arthur W. Johnston, Dredge Engineer.

Chicago, Illinois.

"October number of Excavating Engineer received. Thank you. Will appreciate future numbers".

C. F. Loweth, Chief Engineer,
C. M., & St. P. Ry. Co.

Chicago, Illinois.

"I thank you very much indeed for the Excavating Engineer, which I have looked over with a great deal of interest. Permit me to compliment you both on the idea and the execution".

Bruce V. Crandall, Advertising Service.

Chicago, Illinois.

"Your paper is very interesting and a great improvement on former issues".

Joliet Sand & Gravel Co.

Grand Rapids, Michigan.

"Your October Magazine received, a fine issue".

Michigan Gypsum Co., Plaster Mfgr.

New York, City, N. Y.

"Your October issue is I think the best number I have seen. "Field Notes" will prove very valuable if carefully edited".

J. L. Brownlee, Consulting Engineer.

Easton, Maryland.

"The first copy of the Excavating Engineer has been received and is a most interesting paper. There is nothing to criticize".

J. R. Haswell, Drainage Engineer.

Warren, Pennsylvania.

"We are just in receipt of your very excellent publication "The Excavating Engineer". We find some excellent things in this and have forwarded it to our General Superintendent at Quincy, Fla., but we would be glad to get a duplicate copy for our office here".

Floridin Company.

Chicago, Illinois.

"We desire to congratulate you on the splendid appearance of your October issue. It is well printed; on good paper and its editorials are interesting and useful".

Cement and Engineering News.

St. Louis, Missouri.

"Permit me to compliment you on the nice appearance of the "Excavating Engineer". I have just received copy for October 1912".

Curtis & Co., Manufacturing Co.

Danville, Iowa.

"We like the copy of your Excavating Engineer immensely, the issue answers several very important questions of the present most satisfactorily".

Watson-Fitzgerald Corp., Brick Mfgrs.,
J. T. Watson, Vice-Pres. & Gen. Mgr.

Dubuque, Iowa.

"I think the Excavating Engineer is a decided improvement over Steam Shovel News, being interested in drag line work, glad to see you taking up that end of it".

Mulgrew-Boyce Co.,
By Thomas J. Mulgrew, Pres. & Treas.

Chicago, Illinois.

"Your magazine in the new form looks good".

Walt. Dennis, Asst. Mgr.,
Engr. Dept. C. R. I. & P. Ry.

Columbus, Ohio.

"Your new appearance is an improvement. Your paper is terse, concise and teening with useful information to the Shovel Contractor".

W. D. Winchell, Contractor.

Cape Girardian, Mo.

"Your new publication is a good one and the pictures are especially fine".

Edward Hely, Rock Crusher.

Raleigh, North Carolina.

"The new size and printing is fine; lots of good information in it, keep up the good work".

Wm. Walker Jones, Machinery, Etc.

Giardville, Pa.

"I did not use your Post Card as I had not room to tell you my opinion of your improvement to the Steam Shovel News. I appreciate your pluck in getting up such a lovely little paper or magazine, it should be called. I am greatly interested in the magazine, so I got busy and I made a canvas of all the boys working for me to take the magazine and up to date I have eight names and possibly will get eight more".

Griff Hughes, Contractor.

We wish that others in the field of excavating would boost the game as brother Hughes has. This is real help and the kind that makes possible the improvements we have just inaugurated. Who is the next man that will put his shoulder to the wheel? Only a dollar a year and we propose to give two dollars worth for it. Next!—*The Editor.*

Western Maryland Extension to Connellsville.

(Continued from page 58.)

stances it was found necessary to construct a simple cofferdam of timber sheathing.

All large culverts along the line were built of concrete, the smaller sizes being constructed of stone masonry or of cast-iron pipe, a choice, governed solely by the comparative availability of the respective materials. All of the cement used was tested at the mills by Robert W. Hunt & Co.

The bridges were built to carry Mallet engines with a weight of 440,000 lb. on the drivers, the steel structures being designed for a load about 2 per cent heavier than that of Cooper's E60 specification. The steel work was designed under the supervision of Mr. A. W. Buel, New York, and was fabricated and erected by the McClintic-Marshall Construction Company. About 14,000 tons of steel was required.

The engineering work was handled through three division offices, the first division extending from Cumberland to the Maryland-Pennsylvania line, mile 19, the second from mile 19 to mile 53 and the third from mile 53 to Connellsville, mile 87. The work on each division was divided into residencies varying in length from 8 to 12 miles.

The construction of this extension was carried on under the administration of Mr. B. F. Bush, president, and Mr. Alexander Robertson, vice-president and general manager of the Western Maryland Railway Company, and under the direct supervision of Mr. H. R. Pratt, chief engineer. Mr. Gilbert H. Friend was the principal assistant engineer. Mr. A. W. Jones was chief engineer of the Carter Construction Company and Mr. S. T. Neely was resident manager of the John B. Carter Company.

Steam Shovel Record on Panama Canal

Steam shovel No.134 (H. F. Huth, engineer and Michael J. Carroll, craneman,) working in the red clay borrow pit for Gatun Dam, excavated on September 20, a total of 230 large Oliver dump cars, or a total of 3,910 cubic yards in the working day of eight hours.

This is the highest daily record for a 70-ton shovel since the beginning of operation by the Commission.

Previous high daily records were made on September 16, 17, and 18 by steam shovel No. 120 (Kelleher and Simonson, operators,) which loaded 199, 196, and 214 large Oliver cars, respectively, in the working day of eight hours.

Both shovels were made by the Bucyrus Company of South Milwaukee, Wis.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review in this column such books and catalogues as are sent to us.

Hills-McCanna Co. 153 West Kenzie St. Chicago—Brochure 3½"x 5¾" 32 pages. Illustrates and describes their force feed oiling devices.

Chain Belt Co., Milwaukee, Wis.—Catalogue standard size 6"x 9" 40 pages. Handsomely printed. Describes and illustrates the concrete machinery manufactured by this concern.

Chain Belt 6"x 9" 8 pages. A clever little publication devoted to concrete work. Sent free by applying to the Chain Belt Co., Milwaukee, Wis.

S. G. Taylor Chain Co., 641 Marquette Bldg., Chicago. Catalogue 5"x6¾" 60 pages. Contains lists and illustrations of a great variety of chains.

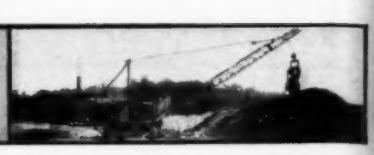
The Barron & Cole Co. 124 Franklin St., New York. Catalogue 6"x9" 24 pages. Illustrates and describes four-wheel scraper and other road-making machinery.

HIGHWAY ENGINEERS HANDBOOK *by Harger & Booney.* 500 pages 4" x 6¾"; flexible leather cover—Price $3.00. As its preface states, this book is a collection, in compact form, of information and data ordinarily required in the field and office practice of road design and construction. It has been designed to meet the requirements of both experienced and inexperienced road men. The treatise on the relative importance of the different parts of the design and the possibilities of economy, without impairing the efficiency of the road, are primarily for the inexperienced engineer. The collection of cost data and the tables will be useful to any one engaged in road work.—McGraw-Hill Book Company, New York and London.

The Forman-Bassett-Hatch Co., Cleveland, O.—The Dunham Plat and Profile Book 4"x9¼", cloth binding. This book contains 28 leaves of cross-section paper preceeded by an index page. There are also 5 pages of valuable tables for ready reference. It forms a most convenient sketch book for engineers and architects, as it is just the right size for pocket use. Price $1.25.

A. Leschen & Sons, St. Louis, Mo. Catalogue—88 pages—7¾"x10¼". Gives a history of the development of the Leschen wire rope with special reference to their "Hercules" brand which has a patented flattened strand.

Field Notes



Send Us Your New "Kinks"

We want every man in the field to contribute freely to "Field Notes". No man that operates a shovel, a dredge or a drag line can say that he has not had hard problems to solve from time to time. Write and tell us what these troubles were and how you remedied them. It will help some other brother who may be having the same trouble.

Then again, when you want a solution to your troubles, let us know what they are and we will help you find a remedy. Ask as many questions as you like. The more the better.

Supplement your questions and answers by rough sketches. No matter how rough they are we can use them.

Now let's see if we can't have a nice bunch of contributions from our operating friends for the December number.—The Editor.

Ordering Repair Parts

Delay in the receipt of repair parts ordered is not only exceedingly vexatious but is frequently very costly to the contractor. The blame for the delay does not always lie with the manufacturer. It is hard for the contractor to realize why the maker of his shovel should have any difficulty whatsoever in filling his order. He must remember that there are perhaps a thousand machines such as his at work and each one may differ in some slight way from the other. It is therefore of the utmost importance that he give the manufacturer clear and explicit information in ordering in order to prevent errors. The following directions are valuable to remember:

1. Always give shop number of shovel and maker's name.
2. Always give pattern number, name or location of part desired. A repair list which is supplied by the manufacturer should give this information. If it does not give as clear a description as possible of the location of the part.
3. If the shovel has been purchased second-hand from another contractor, always notify the manufacturer of the change in ownership so that he may make his records straight.
4. If your shovel has two interchangeable dippers, or different length booms used for different classes of work, be sure to designate clearly for which one the repair part is wanted. This will often save weeks of delay.

A Question

Has the tremendous growth in the use of concrete in the last five years marked the limit of healthy increase?

UNDOUBTEDLY NOT—The conditions and requirements of present day building construction offer possibilities for the still greater use of concrete, vastly greater, if—(and this is the element most essential for further expansion)—if every unit in this and allied industries realizes and meets the need for Publicity—for Education, directed at those builders, owners, engineers, architects and contractors who are not now specifying, designing in or using concrete.

The Cement Shows are planned for Publicity—for Education and are directed particularly at those builders and owners, engineers, architects and contractors who are not now converts to concrete and have not adopted it in their construction.

The Cement Shows to be held at Pittsburgh, at the Exposition Hall, December 12-18, 1912 and Chicago, at the Coliseum, January 16-23, 1913 constitute two unexcelled market-places for cement products and concrete appliances. The advertisement of these market places is one step toward effective publicity for the industry as a whole.

The Cement Shows bring together men from every state, from every field of the cement-using world. The interchange of ideas and viewpoints, the unification of diverse interests, the open discussions with experts, the intimate intercourse with men of experience, the opportunity for close comparative study of methods and materials, are valuable features of the Cement Shows.

The Cement Shows can be made factors of great power in the movement to increase the volume of concrete construction. Successful exhibitions of concrete will re-act upon the industry with an effect proportional to the wholehearted support which they receive. If unstinted support is accorded them and this is combined with individual effort, judicious educational publicity, persistent telling of the superior advantages of concrete, supplemented by the continuous individual advertising of mixers, forms, reinforcing or what not, this will bring results. This will force concrete into first place as a building material. This will bring into early realization the aim to increase the volume of concrete construction.

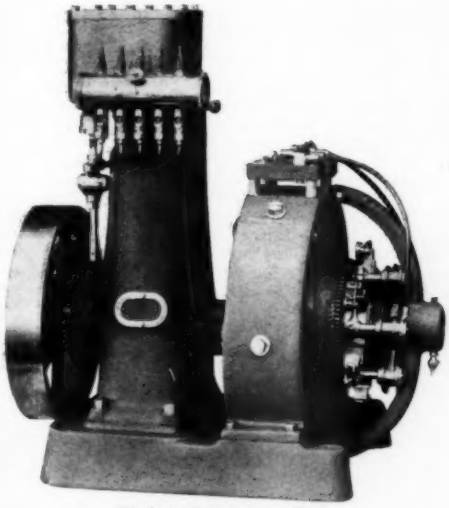
UMI

Electric Lighting for Night Work

When it happens that a contractor must work night shifts in order to complete a contract on time the work will be greatly facilitated if proper illumination is provided. This can best be accomplished by electric lighting as, with it, a perfect distribution of light can be secured.

Recognizing the necessity for this the Bucyrus Company of South Milwaukee has placed on the market the outfit decribed below.

The engine and generator is shown in the illustration. In the bulletin describing the outfit they say that any contractor who has been obliged to install an electric lighting outfit on his machine in the field can recount in detail the troubles he experienced. His generator had to be shipped from one place and his supplies from another. He found that he had forgotten to order enough wire and had neglected to take into consideration numberless small but important things. The result was delay, inconvenience and expense.



Electric Generating Unit.

The long-felt want of an equipment complete in every detail, has been met by them after an exhaustive trial and they are now offering it as the most economical and perfectly adapted electric lighting plant for steam shovels and drag line excavators yet produced.

The outfit is packed and shipped complete with wiring, sockets and all necessary supplies. It is assembled in such a manner that it can be installed by an ordinary mechanic with little trouble. A diagram and complete directions go with the shipment.

The equipment consists of an engine and generator with brackets for mounting, rheostat, switches and all necessary wiring, lamps, et cetera.

The engine is of the reciprocating type which, for this use, has been found to be more economical than any other design. It is direct connected to the generator, the whole being a self-contained unit which completely eliminates the possibility of working out of line.

Standard equipments for steam shovels, drag line excavators or for bank illumination have been designed to meet every requirement.

The great convenience afforded contractors in being able to secure everything necessary for this service combined in one outfit is appreciated as is evidenced by numerous orders which they have already received.

Taylor Iron & Steel Co. Acquires Large Works at Philadelphia and Jenkintown, Pa.

The Taylor Iron & Steel Company announces the acquisition of the Wm. Wharton Jr. & Co., Inc., of Philadelphia, Pa., with works at Philadelphia, Pa., and Jenkintown, Pa., and its subsidiary corporation, The Philadelphia Roll & Machine Company.

The Taylor Company and the Wharton Company have both had a successful history of more than fifty years. During the past eighteen years the business of each company has been largely supplemental to the other in the manufacture and application of Manganese Steel.

The Wharton Company manufactures switches, crossings, special rails and track parts for steam and street railway. Their specialty is the application of TISCO Manganese Steel to these parts.

The relations of the Taylor Company and the Wharton Company have been so close that a unity of interests has been deemed advisable. The Taylor Iron & Steel Company will maintain the corporate identity of the Wm. Wharton Jr. & Company, Inc., and The Philadelphia Roll & Machine Company, and on October 1, 1912, the Taylor Iron & Steel Company will change their corporate Title to the Taylor-Wharton Iron & Steel Company. The organization of the Taylor Iron & Steel Company will become the organization of the Taylor-Wharton Iron and Steel Company, namely: President, Knox Taylor, Vice-Presidents, A. E. Borie, Prof. H. M. Howe, V. Angerer, Secretary and Treasurer, W. A. Ingram.

UMI

Alabama

Mobile—The Mobile Interurban Railway will award contracts at once for grading and building of the right-of-way from the Ridge Road at Spring Hill to Government street, connecting at both ends with the lines now in operation. C. V. Shoub, general manager.

Birmingham—Contract has been awarded the Furtwangler Construction Company, Birmingham, for building about six miles of railroad from Empire to the new mine of the Maryland Coal & Coke Company, at $175,000.

Birmingham—Dunn & Lallande Bros., Alabama National Bank Bldg., Birmingham, have been awarded contract by the Alabama Interstate Power Co., Montgomery, for building a 6-mile railroad as an extension of Clear Lake Lumber Co's line, from Ocampo to site of the power company's dam No. 12 on the Corsa river.

Stevenson—John T. Warden is now operating a Bucyrus steam shovel at this point.

Birmingham—Richard Blight is in this locality setting up Bucyrus shovels.

Birmingham—Plans are being made by the Birmingham Ry., Light & Power Co. (T. R. H. Daniels, Ch. Engr., Birmingham) for the extension of its East Lake line in Birmingham to Huffman.

Gadsden—Gadsden, Bellevue & Lookout Mountain Railway is reported incorporated to succeed the Niccolula Railway, Light & Power Co., which proposed to build 3½-mile electric railway from Gadsden to Bellevue Heights, on the top of Lookout Mountain. The power station and a car shop will be located at Gadsden. Capital, $100,000. U. J. Virgin, 898 Canal St., New Orleans, La., Pres.; W. M. Grainger, Gadesden, Secy. and Treas.; Louis Hart, Gadsden, Gen. Manager, and A. J. Grerenkamp, Gadsden, Electrical Engr.

Arkansas

Johnson & Moore of Little Rock, Ark. have just been awarded a contract in that city and will install a small shovel.

California

Walnut Creek—The Oakland, Antioch & Eastern Railway Company, Oakland, is reported to have asked the supervisors of Contra Costa for a franchise over the county road for a branch line from Walnut Creek to Danville. Stephen E. Kieffer, chief engineer, San Francisco.

Red Bluff—The State Railroad Commission has authorized the Sacramento Valley Railroad Company to issue $4,250,000 capital stock. The Company proposes to build an electric railway in the Sacramento Valley, beginning at Red Bluff and extending in a southerly direction through Tehama, Glenn, Colusa and Yolo counties, to Woodland and thence to Dixon in Solano county, where connection will be made with the Antioch & Eastern Railway. A branch line is also contemplated from Colusa to Williams. Total length is estimated at 160 miles.

Colton—The Southern California Beach Railway has applied for a charter to build a 150-mile electric or steam railway between Colton, Riverside, Santa Ana, Balboa, Laguna Beach, San Juan Capistrano, Oceanside and San Diego. Headquarters, Santa Ana. Capital stock, $3,000,000. Directors: M. L. Cook, H. C. Foster, M. Smithwick, C. R. Sumner and W. C. Gilman, all of Los Angeles.

Anderson—The California, Shasta & Eastern Railway, incorporated in California to build an interurban railway from Anderson to Ingot, via Gella Vista, a distance of 28½ miles, Capital stock, $600,000. Directors: S. E. Brotherton, Felix T. Smith, W. T. Barnett, Paul A. McCarthy, F. D. Madison, Platt Kent and V. W. Vincent.

Los Angeles—The San Diego, Riverside & Los Angeles R. R. is the name of a new company being formed by business men of Los Angeles and vicinity and it is proposed to construct a line between San Diego and Escondido and the continuing on through Riverside and Redlands to its terminus at Los Angeles. Total distance is about 140 miles.

Los Angeles—A new railroad, binding the great Northwest and Southland, is to link Los Angeles and Spokane. It will reduce the distance between them several hundred miles and bring this city nearly as close to Spokane as is San Francisco. The surveys have been completed.

Fort Seward—The Merier-Frazer Co., of San Francisco, and Eureka, has been awarded contract by the Northwestern Pacific Railroad Co., to construct all the masonry work, arches and bridges on the right-of-way between Island Mountain tunnel and Fort Seward.

San Francisco—Mr. H. A. Beesemyer, contractor of Hollywood, Calif., was recently in San Francisco purchasing equipment for a gravel and street job at Bakersfield. He is likely to have a job before long for some runner and craneman.

Los Angeles—Judge Twohy, of Twohy Bros. Portland, Oregon, has been in San Francisco in connection with work on the heavy filling in job being done for the San Francisco, Oakland & San Jose Ry., otherwise known as the Key Route. Twohy Bros. were the low bidders on the job.

San Francisco—"Billy" Algren, of J. H. Whitley & Co., Contractors, is down in San Francisco from their Camp on the Southern Pacific work in Nevada, getting rid of a touch of malaria. After his experience in Panama, Algren thought he was immune and was inclined to turn up his nose at the occasional tramp mosquito of the Sierras. He says now that this was a mistake.

San Francisco—Mr. H. Hertz, Electrical Engineer of the Bucyrus Co. who is making a trip through the Pacific Coast country inspecting certain Bucyrus Drag Lines and Electric Shovels which are on difficult work has just made a test of the electric drag line of the U. S. Reclamation Service at Lahonton, Nevada, a halftone of which appeared in the September issue of the Steam Shovel News. Mr. Hertz reports extremely satisfactory performance of this machine.

Los Angeles, Oct. 4.—Last week was a busy one in Los Angeles. On Monday Barnum's circus and Teddy Roosevelt, Thos. Littlefield and Flossy Barker landed in town. The circus came in on several trains, Teddy on a special car, Littlefield and Barker on a special consisting of two cars, a baggage car and coach; between the two of them they got here. Flossy says the man who put vestibules on the baggage car knew his business.

Jas. Westbrook and wife and Mr. and Mrs. Allerton had reserved seats at the circus.

Los Angeles—What do you think about this? Ted Sawyer, a steam shovel runner, goes to Kirksville, Mo. to complete a

course in Osteopathy. He has made a very careful study of the anatomy of the Bucyrus and has come to the conclusion that he can finish his education at Kirksville. We are not informed by Ted of his plans for the future. Presume he will be a little bit particular as to who is on the opposite shift.

Los Angeles—Wm. Edwards, 34 years of age, died of pneumonia recently at Lone Pine, California. He was buried by the A. U. S. S. M. in the K. P. Cemetary, Lone Pine. Bro. Edwards was a native of Pittsburg and well liked by his associates.

Los Angeles—Cris Kehler, Business agent for the A. U. and Grand Bouncer for the U. S. Hotel, just returned to Los Angeles from a visit in Germany. He brought with him a bran new suit of Dutch clothes. Think he left the wooden shoes in the outskirts of the City.

B. S. Rowan, better known as Joe, and Jake Shehan have just gone to San Bernardino to run a 65 ton Bucyrus for the Santa Fe.

S. J. Barker, shovel runner, has gone to Ely, Nevada, to work for the Nevada Consolidated Copper Co. at Copper Flat.

San Francisco—Mr. J. A. Dearborn, well known in Nevada and Utah, as the former foreman of Liberty Pt, Ely, and as Assistant Superintendent Bingham, recently stopped over in San Francisco on his way to Venice, Cal. The lay-off due to the strike is not bothering James any, as it is timed exactly right for a honeymoon.

Colorado

Denver—Local press reports state that Newman Erb will soon be in Denver to complete reorganization of the Denver, Northwestern & Pacific R. R. Co., it is further reported that about $1,000,000 will be expended for new equipment.

Delaware

Wilmington—The United States Asphalt Paving Company has been incorporated under the laws of Delaware with a capital of $275,000. Edwin Nellis of Brooklyn, N. Y., is the principal incorporator.

Florida

Orlando—Application for a charter will be made by the McKay Land Co., it is stated, to build an electric railway in Orlando. Capital, $130,000. Incorporators: E. A. McKay, A. C. Symmes and C. Jeff Miller.

The Orlando Ry. & Navigation Co. is reported chartered to build an electric railway from Lake Ivanhoe, in Orange County, to Lake Tohopekaliga, Osceola County, a distance of 24 miles. Jas. L. Giles, Pres.; J. N. Bradshaw, Secy., and G. R. Ramsey, Treas.

Georgia

Albany—The organization of the Atlanta Transit Co. it is stated, will be effected at once to build an electric railway in Albany. C. W. Rawson, Albany, is interested.

Perry—The Perry, Macon & Northern R. R. Co. is reported incorporated to build a railroad, 30 miles in length, extending from Perry to Macon. Capital, $100,000. Incorporators: R. L. Marchman, E. M. Beckham, W. E. Ingram and others.

Idaho

Lewiston—Z. A. Johnson, president of the Nez Perce & Idaho Railway, has presented a proposition to extend the road from Vollmer to Lewiston, a distance of 65 or 70 miles, and contemplating that the city raise $150,000, provide terminal ground here and secure right-of-way for the road from Lewiston to Waha. One million, five hundred thousand dollars will be expended in building the road.

Illinois

Peoria—The Central & Western Illinois Traction Company, incorporated in Illinois to build an electric railway from Pekin to Peoria through the counties of Tazewell, Peoria, Fulton, Mc Donough and Hancock to Hamilton, and from there to Keokuk, Iowa. Capital stock, $200,000. Incorporators and first board of directors: J. T. Adams, Columbus, Ohio; C. P. Williams, Chicago; A. L. Ralston, Grove City, Ohio, and others.

Chicago—M. G. Brown, Supt. Motive Power of the Gulfport & Ship Island Railroad Co., Gulfport, Miss., was a caller at the Chicago office last Thursday. Mr. Brown was in the North for the purpose of purchasing a locomotive pile driver to replace the one which was destroyed on Otober first when their pier at Gulfport was destroyed by fire.

Chicago—Mr. Rammerman of Rammerman & Burk, Contractors, Ora, Ind., was a recent visitor at Chicago. They have a contract for furnishing ballast for the Erie Railroad and have rented a 50-ton Vulcan shovel from Earl Clement of Cleveland, Ohio for this job.

Chicago—All of the crushed stone quarries in the Chicago District are overwhelmed with orders and all are complaining of the difficulty in getting cars for moving their product. They also complain of a scarcity of labor.

Highwood—Jesse S. Hyatt, engineer, M. of W., Highwood, writes that the Chicago & Milwaukee Electric Railroad Company is receiving bids for approximately 30,000 cubic yards, steam shovel excavation and widening the cut just south of Milwaukee, Wis., the excavation to be used for filling trestles.

Sandwich—The LaSalle County Electric Railway Company is making preliminary arrangements for the construction of its proposed electric railway from Ottawa to Mendota, Earlville, Sandwich and Somonauk, about 92 miles. Geo. H. Dodge, Chicago is president.

Springfield—The Springfield, Clear Lake & Southern Railway Co., with principal office at Springfield, has been incorporated with a capital stock of $2,500 and proposes to construct and operate a railway from Springfield to Rochester, with a branch line to Riverton, all in the state of Illinois. The incorporators and first board of directors are: W. G. Brown, Rochester, Ill.; N. R. Gordon, A. W. Sikking, W. R. Thompson and H. L. Metcalf, of Springfield, Ill.

Indiana

Indianapolis—The Board of Public Works on Sept. 23 adopted a resolution providing for the elevation of the J., M. & I. tracks from Morris St. to Terrace Ave.

Waterloo—The Waterloo & Angola Utilities Co., recently incorporated, is planning to let a contract for the construction of an electric railway and an electric transmission line between Waterloo and Angola.

Franfort—Application for a charter has been made by the Chicago & Indianapolis Electric R. R. Co. to build an electric railway between Frankfort, Indianapolis and Hammond. Capital, $100,000. Headquarters, Frankfort. Directors: Edward A. Spray, David C. Sliphir and Abraham F. Long.

Iowa

James Howard is operating a 70 ton Bucyrus shovel for The Walsh Hogan Construction Co. at Manilla, Iowa.

Muscatine—Tri-City Railway & Light Co. during the next few months, it is stated, expects to purchase a new switchboard for its sub-station in Muscatine. J. F. Porter, Pres., Davenport.

Kansas

Arkansas City—Application for a charter will be made by the Interstate Interurban Ry. Co. to build a 50-mile electric railway from Arkansas City to Puca City. Capital, $500,000. O. L. Brown is interested.

Independence—The Independence, Neodesha & Topeka Traction Co. is completing its organization and will begin construction about Dec. 1 on its 130-mile electric railway to connect Independence and Topeka, via Neodesha, Altoona, Fredonia and Chanute. The power station and repair shops will be located at Independence Headquarters, Independence. Capital, $50,000. T. Blarksley, Neodesha, Pres.; J. T. Wright, Independence, Sec.; H. E. West, Independence, Treas., and Wm. M. Ness, Independence, Gen. Mgr. and Supt.

Topeka—Plans are being made by the Kansas City & Fort Scott Electric Ry. Co. to begin about Nov. 1 the contruction of its 86-mile electric railway between Kansas City, Mo., and Rosedale, Stanley, Louisburg, Pleasanton, Spring Hill, Linton, Prescott, Fulton, Hammond and Fort Scott, Kan. M. M. Sweetman, Stanley, Gen. Mgr.

Kentucky

Owensboro—The Owensboro Business Men's Assoc. (Geo. H. Cox, Secy.) are reported interested in the construction of a railroad from Owensboro to Elnora, Ind., to connect with a direct line into Chicago.

Hodges & Mimms are installing a 65-ton Bucyrus shovel on their work in Kentucky near Louisville.

Louisiana

Baton Rouge—The Louisiana Railroad & Navigation Co. is reported to have secured a franchise to construct a line on Railroad Ave. to Highland Rd., St. James St. and Natchez St.

Natchitoches—Louisiana & Northwestern R. R. has made application for a charter to construct an extension from its terminus at Natchitoches southeast to Opelousas, La., about 110 miles. J. A. Knox, Homer, La., is chief engineer.

Natchez—The Louisiana & Arkansas Railway is reported about to resume construction on its extension between Jena and Natchez. The List & Gifford Construction Co. is reported to have a contract on this work. W. H. Vance, engineer, Stamps, Arkansas.

Maine

Fryeburg—During the next few months Fryeburg Horse Ry. Co. (Seth W. Fife, Gen Mgr., Fryeburg) expects to place contracts to extend its line through Fryeburg, Stow and Lovell, according to reports. It is expected to later extend this line to Union, Porter, Cornish, Stoneham, Greenwich and Bristol.

Maryland

Deals Island—It is stated right of way has been secured and construction will soon be begun by the Eastern Shore Power, Light & Ry. Co. on its 43-mile line between Deals Island and Snow Hill along the eastern shore of Chesapeake Bay. It will be extended to Salisbury and Pocomoke City. Henry J. Waters is interested.

Baltimore—The Western Maryland Railway has awarded contract to the Claiborne-Johnston Construction Co., of Baltimore, to grade five yard tracks at Hagerstown, work to begin immediately. H. R. Pratt, chief engineer, Baltimore, Md.

Massachusetts

Boston—The Boston & Maine Railway Company will expend $3,000,000 for extensive improvements on various parts of the system. For third and fourth tracking in Lynn $1,200,000 was voted, and $107,000 was appropriated for improvements of track facilities at various points and for machine tools for locomotive repairs.

Boston—The Directors of the Boston & Maine R. R. Co. (A. B. Corthell, Ch. Engr., Boston) on Sept. 11 appropriated $3,000,000 and thereby indorsed plans of the management for improvements on various parts of the system. For third and fourth tracking in Lynn, $1,200,000 was voted, and $107,000 was appropriated for improvements of track facilities at various points and for machine tools for locomotive repairs. About $600,000 was assigned to the elimination of grade crossings at Lynn and Clinton. Improved track facilities in the vicinity of Mechanicville and Rotterdam Junction on the western end of the Fitchburg division will absorb nearly $1,100,000 more.

Salem—The Boston & Maine R. R. Co. (A. B. Corthell, Ch. Engr., Boston) is reported to have completed and presented to the City Council plans for eliminating its grade crossings in Salem, to include depression of tracks from present Mill St. crossing to beyond Bridge St., construction of a new station and of a 4-track tunnel from south of Norman St. to north of Bridge St.

Boston—A deal is said to be under way for the purchase of the Daly & Hannan Dredging Company's plant by a Canadian company for a consideration of $500,000. The Daly & Hannan Company is the largest dredging concern on the St. Lawrence river and has undertaken and completed many large contracts along the river and at Boston Harbor. A new company, it is said, is to be organized with headquarters at St. Johns, N. B., where an extensive contract has been secured.

John Hannan, a stockholder in the old company, will retain an interest in the new company and E. J. Dinneen, secretary of the old company, will be retained in his position by the new company with headquarters at St. Johns. The stockholders of the old company are John Hannan, W. J. Daly, Dr. W. S. Daly, E. J. Dinneen, Thomas Spratt and Dennis Lynch, all of this city.

Michigan

Iron Mountain—The Minneapolis, St. Paul, Sault Ste. Marie Ry. is reported to have purchased the Wisconsin & Michigan Ry., a 135-mile line extending from Peshtigo to Iron Mountain, Mich.

Port Huron—A meeting was held in Port Huron for the purpose of raising a $100,000 stock subscription to the proposed Port Huron & Northern Railroad, which will extend from this city to Lexington and other points in the Thumb district.

Minnesota

La Crescent—Alex McGavock is now engaged on his new contract with the C. M. & St. P. R. R. at this point. Joe Slamp is operating the steam shovel for him.

St. Paul—Chicago, Milwaukee & St. Paul Railway has awarded contract to Morris Shepard & Dougherty, St. Paul, for second-track work from Glencoe to Bird Island, Minn., 37½ miles.

Mississippi

Jackson—The New Orleans & Great Northern Railroad will build line extension to approximate 600 miles, including a line from Jackson to Memphis and from Jackson to Birmingham. R. H. Howard, vice-president and general manager.

Meridian—The Jackson & Eastern Railway has applied for a charter in Mississippi to build a line from Jackson northeast to Union, Miss., a distance of about 65 miles. Incorporators are: S. A. Neville, E. B. McRaven and J. A. Perdue, of Meridian, Mass.

Jackson—It is reported that the New Orleans Great Northern Ry. Co. (R. H. Howard, Gen. Mgr., Jackson, Miss.) has decided to build a line from Jackson to Memphis, another from Jackson

to Birmingham, and also to build an extension from Columbia to some point on the Mississippi coast, either Gulfport, Biloxi or Pascagoula.

Missouri

St. Louis—Double tracking of St. Louis & Kansas City Electric Railway, which will connect the two cities, began September 1. Railroad with power and plant will cost about $15,000,000.

Kansas City—Within the next month or six weeks, by October 31 at the latest, the Wyandotte Construction Company, which is building the Kansas City, Clay County & St. Joseph Electric Railroad, expects to turn over to the owners ready for operation the line from Kansas City to Excelsior Springs. By January 1, it is expected cars will be running between Kansas City and St. Joseph.

To Excelsior Springs all but two or three miles of the steel has been laid, and the entire line is now being ballasted. The line is built of eighty-five-pound steel and is to be ballasted with rock. The line to Excelsior Springs, which is twenty-five miles long, has 115 concrete culverts and six steel structures. The entire line has been built with a view to withstanding a heavy traffic.

Kansas City—The Bridgeron Construction Co., Capt. J. A. Ware Prest., have taken a contract for double tracking on the Wabash R. R. from Excelsior Springs to Kansas City. Headquarters at Missouri City, will commence work right away.

Liberty—W. T. Murray R. R. Contractor of Kansas City has moved his 40-R Bucyrus steam shovel from this city to 5 miles above Harlem to take out 30,000 yards excavation on St. Joseph end of the K. C. St. Jo. & Excelsior Springs Electric Railway.

Montana

Great Falls—The Chicago, Milwaukee & Puget Sound Ry. Co. (E. O. Reeder, Ch. Engr., Seattle, Wash.) is reported to be staking out a railroad route between Great Falls and Choteau.

New York

New York—The Public Service Commission of the First District has approved the plans of the New York Railways (Frank Hedley, Gen. Mgr., 165 Broadway) for the proposed extension of the 116th Street Crosstown line from Pleasant Ave. to the East River.

Flushing—A company, it is stated, is being formed to build a trackless trolley line from the intersection of Oak and Rose Aves. at Kissena Lake Park through Oak Ave. to Jamaica or Colden Ave. and through one of these streets to the Main St. station in Flushing. The organizers are J. W. Parks and W. F. Hencken, of the Paris-Hencken Co.

Buffalo—The Grade Crossing Comrs. (Maurice C. Patch, Chairman) on Sept. 11, adopted the general plan for the elimination of all the grade crossings which have been under discussion for some time.

Gloversville—Mr. Geo. W. Williams, of Newcastle, Pa., who has been erecting a Bucyrus shovel at this point has left for Mexico to erect a machine for the National Railways of Mexico.

Mt. Vernon—James McCaffery, Jr., is engineer and H. W. Qualman fireman on the James McCaffery & Son 14-B Bucyrus shovel operating at this point.

Syracuse—Surveys and detailed plans for eliminating Delaware, Lackawanna & Western Railroad (Geo. J. Ray, Ch. Engr., Hoboken, N. J.) grade crossings by elevating the tracks have been completed and will be presented to the Syracuse Grade Crossing Commission for action. It is said that the Lackawanna Company is ready to start work immediately after the plans are approved by the City and State. The expense of elevating the tracks, construction of the new freight depot and passenger station and the necessary improvements in the yards will, it is reported, approximate $1,500,000.

North Carolina

Fuguay Springs—George Hawarth is operating and John A. Downing is craning a 70-C Bucyrus shovel for Fisher and Corozza at this place.

North Dakota

Jamestown—The Midland Continental R. R. Co. is reported incorporated with a capital of $1,500,000 by A. Duncombe, John Howden Fraser, C. S. Buck, of Jamestown, and others.

Drake—The Board of Directors of the Soo Railway Co., has authorized the extension of their lines in the western portion of the state. Two new extensions are to be rushed to completion. The line from Drake to Plaza will be continued on the Montana line, which is about 90 miles of new trackage, and the Flaxton-Ambrose branch will be built on into northeastern Montana, about 75 miles being added. C. F. W. Felt, chief engineer, Topeka, Kan.

Ohio

East Liverpool—The Ohio River & Northern R. R. Co. is reported formed to construct a railroad from Pittsburgh to Cleveland via Midland, Pa., East Liverpool and Niles. It will connect with what will be known as the Oak Run R. R. near Midland, Pa., running through East Liverpool, and at Lisbon connecting with the Erie & Pittsburgh, and Pittsburgh, Lisbon and Western R. Rs. Authority has been asked of the Public Utilities Commission at Columbus to issue $750,000 capital stock and $2,000,000 worth of 30-year 5 per cent bonds, the proceeds to be used in building 31 miles, which will take a year to construct. The Erie R. R. Co. (C. W. Bucholz, Consulting Engr., New York, N. Y.) and the Crucible Steel Co. of America, Midland, Pa., are reported interested.

Struthers—M. J. Scanlon, of New Castle, Pa., is reported to have secured contract for construction of a 2-mile section of the Lake Erie & Eastern R. R. between Struthers and East Youngstown; cost about $30,000.

Oklahoma

Ponca City—Plans have been completed for the extension of the Arkansas City Electric Railway, south, connecting with the towns of Chilocco, Newkirk, Kildare, Blackwell, Ponca City and Tonkawa, all in Kay County, Okla. A. H. Denton and E. Kirkpatrick, of Arkansas City, are interested.

Oregon

Medford—The Medford & Crescent Railway Company has been incorporated by W. H. Gore, of Medford, Oregon, with a capital stock of $50,000, to connect this place with Crescent City, giving access to the coast.

Portland—Contract for construction work on the Multnomah Central Railway has been awarded Twohey Brother Company, Portland.

Portland—Silver Falls Lumber Company has awarded contract to Flagg & Standifer, Portland for construction of 25 miles of standard gage logging road out of Silverton into the heavy Douglas fir belt of Silver and Abiqua Creeks. Construction will begin at once.

Pennsylvania

Lansford—W. G. Meade is engineer on the L. C. & N. Co. steam shovel operating near this city.

Hanto—A. G. Heideck is at present acting as paymaster for the McNichol Paving and Construction Co., at Hanto, Pa.

Cambridge Springs—John Filker is craning a Bucyrus 70-C steam shovel at this point, for the Robert Grace Contracting Co.

Hopeland—The Ephrata & Lebanon Street Ry. Co. (H. H. Singer, Pres., Ephrata) plans to extend its line, now in operation between Ephrata and Hopeland, 7 miles distant from Hopeland to Labanon, according to reports.

Latrobe—The Latrope & Hecla St. Ry. Co. is reported incorporated to build a 9½-mile electric railway in Latrobe. Capital, $57,000. Directors: D. M. McBride, J. S. Munroe and W. B. Crawford, Pittsburgh, and others.

Wilson—The Pine Run St. Ry. Co. is stated incorporated to build an electric railway in Wilson. Capital, $8,400.

South Carolina

Charleston—The Charleston & Summerville Interurban Railway Company is reported chartered to build an electric railway between Charlestown and Summerville, 20 miles. Capital, $500,000.

Tennessee

Memphis—The New Orleans & Great Northern will build from Jackson, Miss., to Memphis, according to statement made by R. H. Howard, vice-president.

Algood—The Tennessee, Kentucky & Northern Railroad is said to have been incorporated in Tennessee to construct a line of railroad from Algood to Livingston.

Memphis—Plans for extending the Jonesboro, Lake City & Eastern Railroad to Memphis from Wilson Ark., and from Jonesboro to Newport, Ark., were announced by officers of the road at Jonesboro. It is about 40 miles from Memphis to Wilson, and it is said that the work will cost about $12,000 per mile for this part of the road.

Brentwood—A. G. Fretwell is operating a 60-C Bucyrus shovel in this vicinity. Mr. Will Leonard is engineer, and H. H. Ruddell cranesman.

Texas

Dallas—It is stated that surveys are being made by the Eastern Texas Traction Co. for a new route for its line between Fate and Rockwall. Surveys will also be made for a new route from Garland to Dallas. J. B. Murphy, Greenville, Gen. Mgr.

Tyler—The Warford Construction Co., Dayton, O., it is stated, will begin the construction of an electric railway in Tyler. Chas. H. Warford, of Tyler, Pres.

Houston—It is reported that the New Orleans, Texas & Mexico division of the Frisco system (F. G. Jonah, Ch. Engr., St. Louis, Mo.) is to be improved at a cost of $250,000 to $400,000. Among the improvements will be 30 miles of siding, a number of buildings, freight and passenger depots and improvements in terminal facilities.

Cleburne—Stone & Webster, of Boston, Mass., are reported to have completed a survey of an extension of the Fort Worth-Cleburne line from Cleburne to Hillsboro. The new line touches the town of Alvarado.

Utah

Bingham—Oris Ruff is craning a 95 Ton Bucyrus for the Utah Copper Co., at this point.

Virginia

Richmond—It is reported that beginning early next year, two branch roads of the Chesapeake and Ohio will be built in Kentucky, mainly to develop coal properties. These new branches will aggregate between twenty-five and fifty miles. F. I. Cabell, chief engineer, Richmond.

Culpepper—The Culpepper, Madison & Rappahannock R. R. Company, Culpepper, has been chartered in Virginia with $1,000,000 capital stock to build a line from Culpepper to Washington, Va., a distance of about 32 miles. P. H. O'Bannon, Sperryville, is president.

Washington

Spokane—Foley, Welch & Stewart, Spokane, Vancouver and St. Paul contractors, have been awarded a $16,500,000 railroad contract by the Great Trunk-Pacific Railway. Plans call for building from Vancouver to the Grand Trunk-Pacific at Fort George, a distance of 348 miles. This is one of the largest railroad contracts ever awarded in the west and exceeds any similar contract in recent years. Included in the projected line is some of the heaviest building on the American continent. Two mountain ranges are to be crossed. Construction of the entire main line between Winnipeg and Prince Rupert will be finished late next year.

The Prince George-Vancouver line will run northwest.

Tacoma—The Washington Electric Railway Co. has been incorporated with a capital of $1,000,000 to build a line between Tacoma and Vancouver.

Tacoma—Plans are being made by the Tacoma Ry. & Power Co. (Stone & Webster, Gen. Mgr., Boston, Mass.) to improve its lines in Tacoma.

Wisconsin

Elkhorn—The Badger Ry. & Light Co., has applied to the City Council for a franchise to construct and operate an electric railway at Elkhorn. H. B. Kamschulte, Milwaukee, is president and general manager.

Milwaukee—The season just closed, has witnessed the strongest competition for supremacy in the M. & M. Base Ball League in many years. Several of the clubs were closely tied for first place

but The Bucyrus Team won the pennant by defeating Cutler-Hammer 3 to 2 in the play off. The "Little Giants" did not lose a single series in the entire season and after June 22nd were never out of the league leadership. Farrell and Sievers performed

in classy fashion on the mound and were the most learned boxmen in the league. Farrell bore the brunt of the slab work, so to him most of the credit is due for bringing to South Milwaukee its first championship. A glance at the averages shows Bucyrus wielded the war club to the tune of .292 for the years work and fielded .926. Weber gets the batting honors with 400% closely followed by Sievers .395, Farrel .375 and Zilg .359. Keese leads in stolen bases with 20 a jump of 5 over Zilg and Farrell. Zilg leads in sacrifice hits having 8 to his credit. Farrell scored the most times 22. Zilg topped the fielding averages with .979. Farrell and Fletcher were second and third respectively. The official team record complete follows:—

	Won	Lost	Pct.
Bucyrus	13	4	.764
Federals	13	5	.721
Cutlers	12	5	.706
Ingecos	12	6	.667
Millers	7	9	.438
Standards	7	10	.411
Pattons	3	16	.163
Schulz	4	14	.125

BATTING	AB	R	H	S.B.	S.H.	Ave.
Coppersmith, Sub	7	0	3	1	0	.429
Weber, rf	55	8	22	1	0	.400
Sievers, 3b	76	13	30	5	0	.395
Farrell,p	72	22	27	15	4	.375
Zilg, 1b	78	20	28	15	8	.359
Yager, c	21	1	6	2	0	.286
McGrath, 2b	77	19	21	4	3	.273
Keese, cf	83	19	22	20	2	.265
Daehling, c	61	9	14	3	0	.230
Fletcher, lf	62	7	14	4	0	.226
Hugel, ss	38	10	6	5	0	.155

FIELDING.	T.C.	P.O.	A.	E.	Ave.
Zilg, 1b	190	167	19	4	.979
Farrell, p	70	19	48	3	.959
Fletcher, lf	41	37	2	2	.951
Yager, c	38	31	5	2	.948
Sievers, 3b	66	25	57	4	.940
McGrath, 2b	80	49	26	5	.938
Daehling, c	131	100	18	13	.901
Keese, ss. & cf	65	38	19	8	.877
Weber, rf	12	7	2	3	.750
Hugel, ss	42	10	19	14	.675
Coppersmith, Sub	3	2	0	1	.667

Team batting average... .292 Team fielding average... .926

Canada

From the Land of the Midnight Sun.

We have a very interesting letter from Mr. A. J. Mackinon, Craneman on Bucyrus Shovel No. 7021 on which our friend Tomas Hawkins is runner. The letter is dated at Morinville, Alberta, Canada and states that they are at work 95 miles north of Edmonton "where the bears play peek-a-boo around the cars". This can be verified by Jim Mitchell, who is firing the shovel, who now holds the record for sprinting on rough track work. Jim was on his way home a few nights ago, after having looked

Jim Mitchell on the Home Stretch.

over his boiler for the night, when he met a real sassy she bear. Jim's first impulse was to be guided by the story of the dutchman who found himself similarly situated. Dutchy was not much for religion but the 600 pounds of bear meat just ahead caused him to mutter:

"O, good Lord if you are on de site of de bear haf pidy on me, but of you dond stick by de bear and are on my site haf pidy on de bear. But if you aind on de side of de bear and needer mit me den shtand asite and you will see de damndest fight vat gifes".

But, on second thought, Jim remembered he was a great runner and he claims that the mile and a quarter to camp was made in 36 seconds flat. And not a bit scared. But to get back to business it looks like these boys were some crew. On a recent morning they oiled up and loaded 14 30-yard Hart cars in 25 minutes. The speed was so great that "the dipper met itself coming back into the pit".

And the homesteaders knew
By the rockets that fell
That the man at the throttle
Was giving her h – – l.

The shovel is working in a sand pit with a 35 ft. bank and is in comparatively easy digging.

Regina, Sask.—It is reported that the electric railway committee of the Municipal Council plans to spend the sum of $600,000 on improvements to the system during the next few months.

Trail, B. C.—The Canadian Pacific Ry. Co. is reported to have decided to construct a 41-mile line from Trail, B. C., to Metaline Falls, Wash. C. W. P. Ramsey, Engr. of Construction, Montreal, Que.

Vancouver, B. C.—It is reported that Foley Bros., of St. Paul, Minn., with Welch & Stewart, of Vancouver, B. C., are reported to have secured $16,500,000 contract for building the Grand Trunk Pacific's new line from Vancouver to Fort George, 348 miles in length.

It is reported that the Canadian Pacific Ry. Co. (C. W. Ramsey, Engr., of Construction, Montreal, Que.) will this year commence building a tunnel 8 miles long in the Rocky Mountains to eliminate the heavy grades of Rogers Pass; the road will put in double tracks and install electric equipment for the operation of the tunnel.

The Great Northern Ry. Co. is reported to have awarded a contract to Guthrie-McDougal Co. for construction of a 42-mile extension westward from this city toward Vancouver for about $1,500,000.

Brooks, Alta.—Engineer W. Caffery, is operating an 80-ton Bucyrus Steam Shovel for J. S. McKinney & Co. on the C. L. R. Irrigation Ditch 3 miles south of Bassano Alberta. The shovel is giving excellent satisfaction, giving no trouble and being in operation continually since spring.

Toronto—The Hill-Leonard Engineering & Construction Co., Ltd., Toronto, Ont., advises that it will handle general construction work through that province, especially railway construction. Its equipment consists of the type of machinery necessary to this line of work and the company will be in the market from time to time for additional supplies, including dump cars, small locomotives, shovels, drills and small tools, such as scrapers, etc.

Brazil

Diamantina—G. W. Dunphy, formerly one of the erecting engineers for the Bucyrus Co., is located at Diamantina, Brazil, where he is installing two Vulcan shovels. Mr. Dunphy and his son are getting along fine and like the country very much. They wish to be remembered to all of their old friends.

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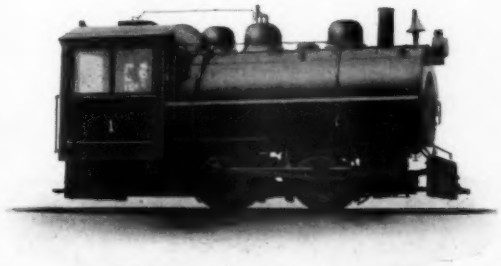
FOR CONTRACTORS' SERVICE



We build any type or class,—Dinkeys in all sizes, four wheel switchers, six wheel switchers and the Shay Geared Locomotive for extreme-heavy grade work. The Contractor of today, in order to be able to do his work economical, must have Locomotives suited to various conditions. We specialize on all classes and not only on one or two types. Our locomotives are of the most modern construction, built entirely in our own shops, and of the highest grades of materials. Guaranteed throughout.

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LIMA LOCOMOTIVE CORPORATION

LOCOMOTIVE PLACE LIMA, OHIO

FOR SALE OR RENT

FOR SALE or RENT for Immediate Delivery

Shovels—

One No. 0 Thew Full Circle with ⅝ yd. dipper, mounted on combination trucks, so that it can be used as traction or Railway wheels.

One No. 0 Thew Shovel out of factory only one year thoroughly re-built having been in railway wreck. Can not be told from new.

One No. 0 Vulcan Traction Steam Shovel, mounted on traction wheels, only had 4 months service. New condition.

One Little Giant 26-ton Traction Shovel, equipped with one yard dipper, and has extra large boiler, first class condition.

Two 45-ton Vulcan Steam Shovels mounted on railway wheels, with 1½ yard dipper.

Four 45-ton 1½ yard dipper shovels manufactured by Allis-Chalmers Co., two of these shovels have never been assembled. One has had three months service and one twelve months.

One 45-ton Marion Shovel mounted on railway wheels with 1½ yard dipper.

One Lidgerwood Derrick and Plow manufactured by the Hicks Locomotive and Car Works.

We at all times carry machines in stock and same can be inspected here at any time.

CREAM CITY EQUIPMENT CO.
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Marion Model 60 Shovel, good order. Close price.
Several Locomotive Cranes, 5 to 25 ton cap. First class.
Lidgerwood Class "B" Drag-Line Excavator, 1½ yard. First Class.
10 Western 24" gauge, 1¼ yd., 2-way dump cars overhauled.
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Two Baldwin Saddle Tank Locomotives, 9" x 14", 36" gauge, shop numbers 26885 and 26886. $900.00 each.

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The above locomotives are in first class operating condition, being complete with all fittings and same are equipped with steam brakes. They are offered subject to prior sale. F. O. B. Pittsburgh, Pa.

Contractors' Machinery & Supply Co.,
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FOR SALE

Second-Hand Steam Shovels

1—Class E. 65-Tons
1—Class D. Vulcan 50-Tons
1—Giant D. 60-Tons
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Second-Hand Locomotive Crane

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FOR SALE—Dipper Dredge, ½-yd. dipper. Scow 12 ft. wide and 50 ft. long. Will sell cheap. Address,

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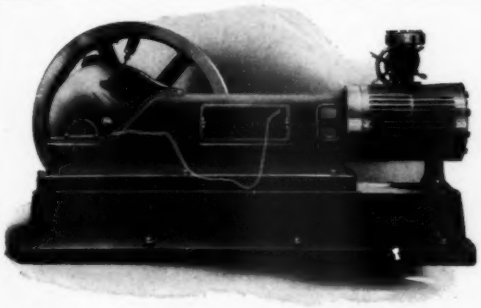

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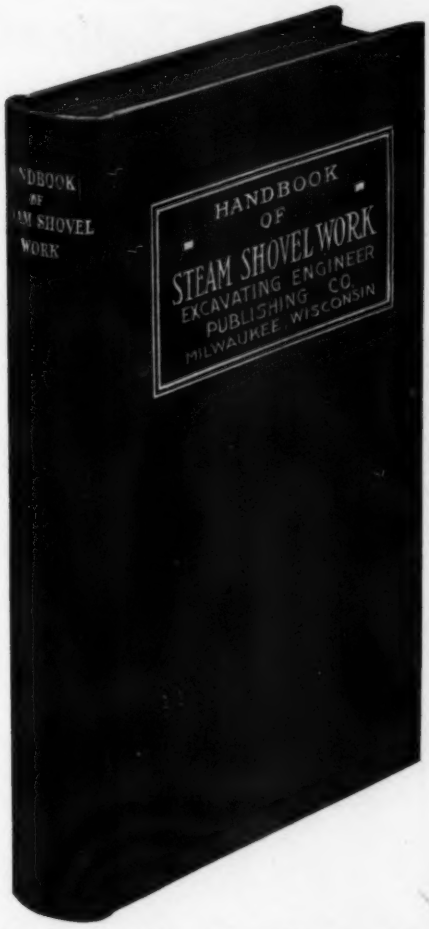

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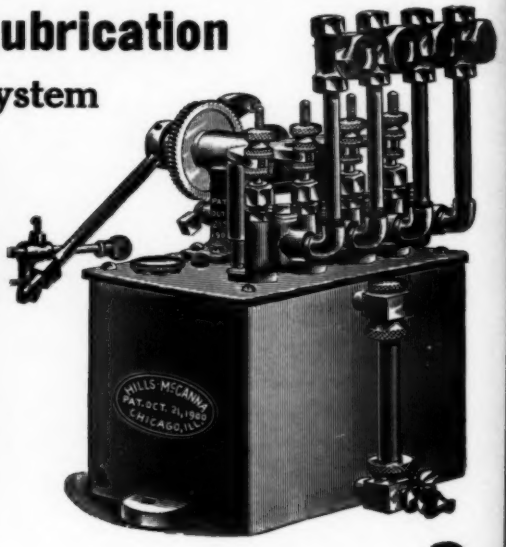

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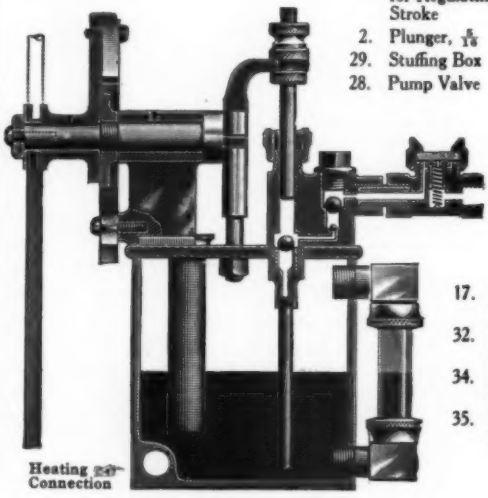

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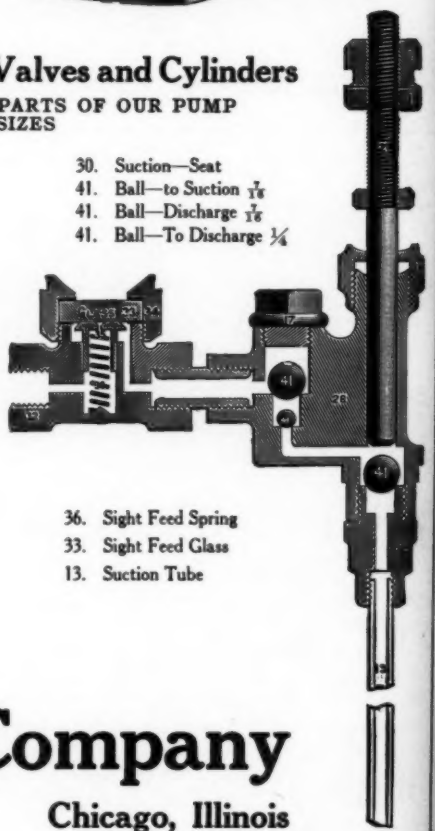

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